Guide to the Surgical Instruments & Objects in the Historical Series. Museum, Royal College of Surgeons, England.

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An Apothecary's Signboard.
(1623.)

(see page 85.

MUSEUM, ROYAL COLLEGE OF SURGEONS OF ENGLAND.

GUIDE

TO THE

SURGICAL INSTRUMENTS

AND

OBJECTS IN THE HISTORICAL SERIES

WITH THEIR HISTORY AND DEVELOPMENT

BY

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WITH A FOREWORD BY THE CONSERVATOR,

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FOREWORD

BY THE

CONSERVATOR OF THE MUSEUM.

At all periods of its history the Museum of the Royal College of Surgeons has been particularly fortunate in the men who have served it as volunteers. No sooner has a task requiring special ability presented itself, than the right man has come forward to undertake it. This was so in 1912; the collections of surgical instruments and medical appliances, on which surgeons of all countries have lavished their inventive genius for many centuries, had far outgrown the original catalogue. A man was needed who was learned in the general history of medicine and familiar with the technique of the many specialities into which surgery has branched. Mr. Alban Doran had this knowledge; he had retired from practice and offered his services to the Council of the College which were gladly accepted. He began to prepare a descriptive catalogue of these collections in 1912; by 1926 he had almost finished his task. He was then in his 77th year; it was then, when his sight and strength were failing him that Mr. C. J. S. Thompson, M.B.E., came to his aid and to the aid of the Conservator. When Mr. Doran died in 1927, Mr. Thompson continued his task and was appointed by the Council, Honorary Curator of the Historical Section of the Museum. Mr. Thompson is recognised at home and abroad as an authority on all that pertains to

the technique used by medical men of past times in the treatment of disease. He has studied in particular the evolution of the various instruments and appliances employed in surgery. He has written, with the approval of the President and Council this guide to serve the needs of those who visit the great and ever-growing collection now under his charge. The visitor will find that this little book will serve not only as a guide to the more important exhibits, but also as an introduction to the many interesting principles which underlie surgical inventions. Indeed this book is more than a guide ; it is an important contribution to the history of surgery.

ARTHUR KEITH.

GUIDE TO THE SURGICAL INSTRUMENTS AND OBJECTS IN THE HISTORICAL SERIES WITH THEIR HISTORY AND DEVELOPMENT.

The Collection of Surgical Instruments, appliances and other objects of interest now embodied in the Historical Section of the Museum has been formed chiefly by gifts and bequests during the last hundred and fifty years.

The first attempt to arrange it was made in 1871, when a separate room was allocated to the instruments. In 1878, Mr. Walter Pye, at that time Assistant to the Conservator, Sir William Flower, compiled a manuscript list of the instruments and numbered them, but no attempt was made at classification until the late Mr. Alban Doran, F.R.C.S., took up the task about 1912. With characteristic energy he began to compile a descriptive and detailed catalogue of the entire collection which occupies many volumes. He classified, numbered and measured every instrument with meticulous care, and has thus left a record that will be of invaluable assistance to students of the history of surgery.

Since that time, the collection has been largely increased and re-arranged and now comprises over 2,000 specimens, many of which are of great historical interest.

It is hoped by the aid of this short descriptive guide that the study of the instruments will be made more interesting to students and visitors, who for more detailed and complete information are referred to the large type-written catalogue which is always available in the instrument room and library.

I.

SURGICAL INSTRUMENTS.

The original scheme and classification adopted, with some modifications, was that which had been approved by the Commissioners of the Great Exhibition of 1851, and this, with certain necessary extensions, is still carried out. It comprises the following sections :—

I. Dressing and General instruments.

II. (Section A.) Instruments for operations on the Eye and its appendages.

III. (Sections B to F.) Instruments for operations on the Ear, Nose, Mouth and Pharynx, Thorax and Abdomen.

IV. (Section G.) Instruments for operations on the Genito-urinary system in the male, with (Section H) instruments employed in the treatment of vesical calculus in the female.

V. (Sections I, K and L.) Instruments for operations on the Extremities, the Osseous system and the Vascular system.

VI. (Sections M to S.) Orthopædic instruments, Bullet extractors, Apparatus for the investigation of disease ; Splints ; Trusses, etc. ; Dissection and post-mortem instruments ; Replacers of lost parts ; Anæsthetic apparatus.

VII. (Section T.) Instruments used by Ancient, Semi-civilised and barbarous nations.

VIII. Obstetrical and Gynæcological instruments.

IX. (Section U.) Medico-Legal. Comprising objects and specimens of medico-legal interest—including relics of notorious criminals, pieces of cord, string, etc., used for self-strangulation.

DRESSING AND GENERAL INSTRUMENTS.

The first object to which attention is directed in this section is a **Surgeon's pocket cerate case** (**1**), the outside of which is covered with green shagreen. It dates from the latter

part of the XVII or early XVIII century. The interior is divided into several compartments for holding cerates or ointments used in dressing wounds, such as the ointments of apple, lead and mercury. These cases were usually carried in the pocket for use at the bedside. This specimen belonged to William Long, Master of the College of Surgeons in 1800, and was presented to the museum by his widow. Guy de Chauliac [1298-1368] was accustomed to carry a cerate case containing five ointments together with his pocket case or etui of instruments, which would include a spatula for spreading them on lint or tow. In the XVI century these cases were usually carried by surgeons suspended from the girdle. **A Surgeon's pocket case or etui** (**2**), partly silver-plated and the rest covered with shagreen, dates from the early XVIII century. It contains two pairs of scissors, one having curved blades commonly known as probe-scissors, a pair of dressing forceps, an ear scoop and grooved director, and a spatula for spreading cerates or ointments. The perforations in the handle of the latter were made to assist cleaning. When this was required, a knot was made at the end of a piece of string and the other end passed through one of the holes. The instrument was then suspended in a jug of boiling water. This case formerly belonged to Mr. Hector, a schoolfellow and friend of Dr. Samuel Johnson. Another **Surgeon's silver pocket case** made about 1750 (**3**) is cylindrical in form and contains a pair of straight scissors, dressing forceps, silver spatula, two flexible silver probes, a female catheter, a lancet and a hollow white metal rod which terminates in a ring for holding a quill containing lunar caustic. The other end of the rod is hollow and forms a receptacle for red oxide of mercury.

Following is a collection of surgical pocket cases dating from about 1780 to the end of the XIX century.

No. **4** is a case that belonged to **Mungo Park** (1771-1806 ?) the famous African explorer, whose first expedition left England in 1794. He gave this case to Sir Anthony Carlisle as a

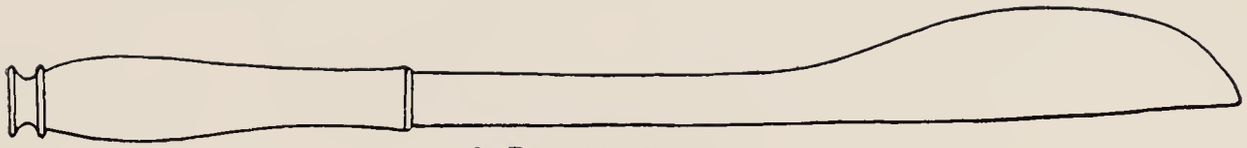
memento, before he left on his second expedition in 1805, from which he never returned.

No. **5** is a pocket case that belonged to David Dundas; **6** a case used by Robert Liston the famous surgeon; **7** a case that belonged to Sir William Fergusson; **7A** a pocket case used by Sir William Flower, K.C.B., F.R.S., during the Crimean War, in which he served as a surgeon. He was Conservator of the Hunterian Museum from 1861 to 1884. No. **7B** is a pocket case of instruments richly mounted in silver-gilt, that formerly belonged to Thomas R. Colledge, M.D., F.R.C.S. (1797-1879), surgeon of the East India Company, and one of the founders of Medical Missions in the far East. No. **8** is Sir John Erichsen's pocket case. Nos. **9, 10** and **12** are types of the lancet cases of shagreen and tortoise-shell that were commonly carried by surgeons in the waistcoat pocket in the XVIII century.* No. **11** is especially interesting as having belonged to Baron Dimsdale, who at the desire of the Empress Catherine went to St. Petersburg in 1768 to inoculate her and her son against small-pox.

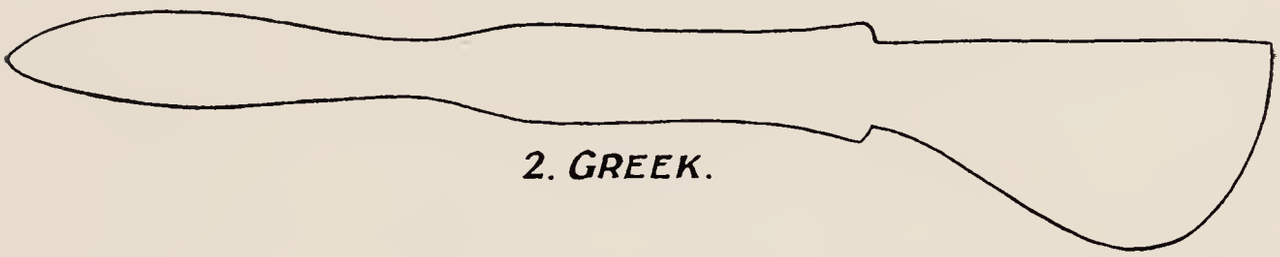
Nos. **13** to **23** comprise a representative collection of scalpels, an instrument that has altered but little in form for the last 2,000 years.

Probably the earliest specimens known are among some bronze instruments found in Babylonian sites believed to date from 1,000 B.C. They have a bow-shaped blade with a shank terminating in a handle (Fig. 1). The early Greek form (Fig. 2), which is very similar, is represented in a votive tablet in the Acropolis at Athens, and the same shape was probably used in Hippocratic times. On an inscribed tablet on the wall of the temple of Kom-Ombos in Upper Egypt are incised a number of surgical instruments which may be taken as types of those used in Egypt about 146 B.C. They include two straight knives and scalpels with bow-shaped blades (Fig. 3) similar in shape to those carved on the Greek tablet. Judging

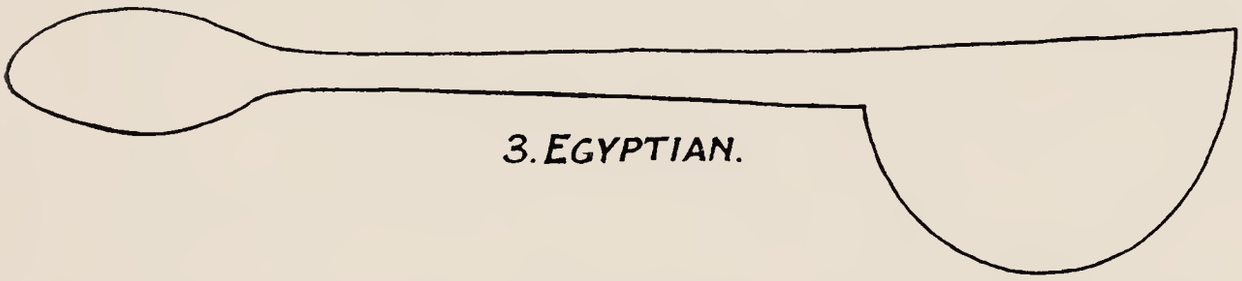
* The word *lancet* did not come into general use in this country until the fifteenth century. Caxton in 1474 mentions "a knyf and launcettes: and in a translation of Vigo's works in the sixteenth century allusion is made to "a sharpe instrument as with a launcet."



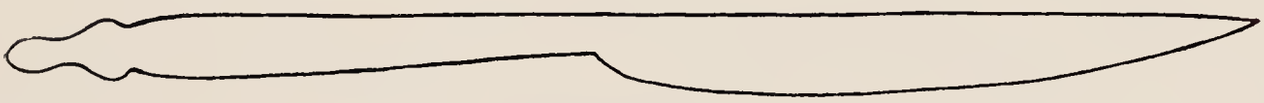
1. BABYLONIAN.



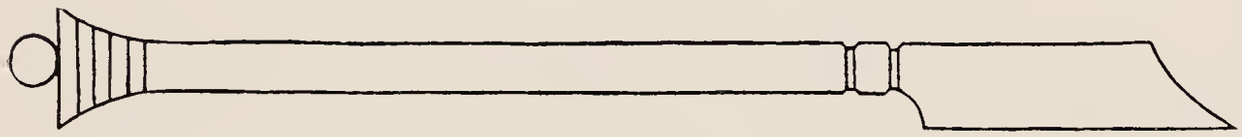
2. GREEK.



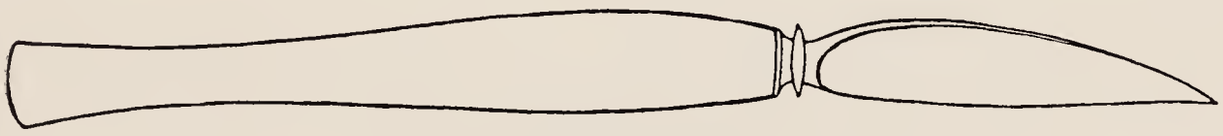
3. EGYPTIAN.



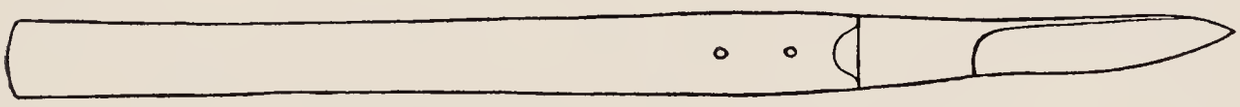
4. ROMAN.



5. ARABIAN.



6. 18TH CENTURY.



7. 19TH CENTURY (SIR W. FERGUSSON).

The development of the Scalpel.

from the Roman instruments found at Pompeii which date from *Ca* 200 A.D. (Fig. 4) the scalpel, for which the Latin authors use the word **scalpellus,** had apparently a straight, sharp-pointed blade and was usually made of steel, although other surgical cutting knives were of bronze or bronze with steel blades.

From the XI to the XVI century, a triangular-shaped blade, sharp at the point and broad at the base with a straight cutting edge, was used, as figured by Albucasis (Fig. 5), and so on until the XVII century, when a straight blade like that of a pen-knife as figured in Scultetus came into vogue. About the middle of the XVIII century the bow-shaped blade returned in a modified form, as shown in Brambilla (Fig. 6), and has continued with variations to the present day. Lancet-bladed scalpels, of which **13** is a type, were used from the XVI century, and the double-edged blade probably dates back to Roman times. The shouldered type with blunt back, is figured by Brambilla and Savigny, and is generally employed at the present time. Many surgeons had their favourite shaped blade, some preferring it broad and others narrow, as instanced in the scalpel used by Sir William Fergusson (Fig. 7).

Bistouries were known from the XII century. The word was first applied in mediæval times to a large knife or dagger. Thus Caxton in ' Eneydes ' (1490) says " Eneas had a bystorye or wepen crysolite as it were a lityl sword cassles." Later, in surgery, the name was applied to three types of knives, viz. straight, curved and probe-pointed curved. Ambroise Paré employs the word " bistorie " in 1558 in his " Oeuvres complètes " and in the edition of 1561, a curved bistoury closing into a handle is figured. Percival Pott designed a blunt-pointed, curved bistoury with a guard to the blade (**35 A**) for operating on fistula-in-ano.

A curious **abscess opener** (**38 A**) which probably dates from the XVI century is noteworthy. Inserted when the curved blades are closed, by ingenious mechanism in the handle they are constructed to expand and so open the abscess or bubo. No other specimen of this instrument is known.

Nos. **42** to **43 D** are samples of **dissecting spring forceps** and **46** to **54** various types of **tenacula.**

The tenaculum was in general use down to the middle of the nineteenth century. Le Dran figures one in 1749 and refers to it as "an instrument to lift up the end of any small artery to be tied that lies in loose membranous parts." **Bromfield** in 1773 described his type (**52**) which was a short instrument with steel handle. **Savigny** in 1798 figures "a common tenaculum for taking up arteries or large vessels in capital operations," and remarks that "the double tenaculum (**53**) was devised by **Mr. Astley Cooper."** Early in the eighteenth century, Heister alludes to an instrument of similar design for "removing the excresence formed between the eye and the eyelids." No. **59** is a sample of **Liston's ligature needle** which he employed for the purpose of passing ligatures in operations for the cure of large nævi. No. **60** are **Curved needles used by Abernethy.** The use of large needles for passing ligatures was still in vogue at the beginning of the nineteenth century. John Bell taught that Ambroise Paré's practice of making use of a large needle when an artery or a stump cannot be secured by the forceps, was still sound surgery. Guy de Chauliac used one in the fourteenth century. Liston preferred the tenaculum and afterwards his special forceps (I **50**), and for the application of sutures introduced a needle "just slightly curved towards the point." Ambroise Paré in 1578 made use of the threaded needle, and a separate thread when recurrent hæmorrhage occurred after amputation, while he also employed it for stopping bleeding from a deep wound. In the early eighteenth century the needle was used for both purposes.

Acupuncture was practised by the Chinese from an early period and by the Japanese in the sixteenth century. They had charts made of the body, indicating where the needle should be inserted. No. **64** is a set of **Japanese gold wire needles used for acupuncture.** In 1683, Ten Rhyne described the operation as being "hitherto unknown to Europeans."

It does not appear to have been introduced into England until the early part of the nineteenth century. Mores Churchill writing in 1825, states that "Berlioz uses a steel needle three inches in length." Sir James Young Simpson advocated acupuncture in a treatise entitled "A new method of arresting surgical hæmorrhage," in 1864, and Lister resorted to it in the treatment of sciatica.

Various types of **Seton needles** are represented from Nos. **67** to **69,** and **70** is a **needle and cannula** for seton treatment of abscess frequently employed in the middle of the nineteenth century. No. **73** is an **exploring trocar and cannula.** Albucasis figures a simple exploratory needle in the fourteenth century, and the exploring trocar itself was advocated by Fergusson in 1870.

Nos. **78** to **79 E** are various specimens of **Cautery irons** dating from the eighteenth century.

The **cautery** has been employed in the treatment of disease from early times and was used by the Greeks and the Romans. The Anglo-Saxons employed the cautery in the XII century and the Arabs made frequent use of it. The first book of Albucasis 'De Chirurgia' is devoted to directions for treatment by the cautery. It was regularly employed to stop hæmorrhage throughout the Middle Ages down to the time of Ambroise Paré, who after re-introducing the ligature, discarded it. Cauteries, after amputations, continued to be represented in the works of the XVII and XVIII centuries down to 1780, when several types are figured by Brambilla.*

* A rare type of cautery called "Capsula Casseriana" or 'concealed cautery' is figured by Scultetus. The only known specimen of this instrument is to be found among the Prujean instruments in the possession of the Royal College of Physicians. Scultetus says, "It was invented by Julius Casserius Placentinus to avoid heat, pain, and sight of the fire, which fearful men, women and children are afraid." The actual cautery is hidden, "no pain is perceived at all or burning underneath, by reason of the wonderful swiftness of the operation." It consists of a cylindrical pewter box, small enough to be concealed in the hand. A short tube protrudes from the bottom in which the heated cautery is inserted and the lid secured. Inside the box is a circular plate resting on springs and by pressing a flat-topped pin in the lid, the cautery is projected through the tube as far as may be necessary.

Treatment by **"Moxa"** has been practised in the far East from a period of antiquity. It takes its name from the burning of a cotton-like substance usually obtained from the leaf of the **Artemesia chinensis** called **"Moxa"** by the Japanese. The place where it is to be employed is first marked, and the surrounding region then covered with a wet rag having a hole in the middle over the marked spot. The operator having set fire to the top of the **"moxa,"** places the moxa-box over the spot and keeps up combustion by means of a blow-pipe until the whole is consumed.

The Portugese and Dutch introduced the practice into Europe, and Busschof published a work in Dutch 'On the Cure of the Gout by Moxa,' in 1674, which was translated into English in 1676. Van Swieten and Pouteau employed it, and the latter and the Baron Larrey practised and advocated its use in France. Wallace of Dublin in 1827 simplified the apparatus by reducing it to a forceps and a flat piece of silver wire to surround the moxa.

No. **80** is the **moxa apparatus** enclosed in a box.

No. **81**, Balmanno Squire's **Hair clipper** made in 1881 for closely cutting off hair on the scalp or any part of the skin, is the first instrument of the kind invented.

Section A.

Instruments for Operations on the Eye and its Appendages.

The important feature of this section is the number of instruments which were actually used by the distinguished ophthalmic surgeons whose names are associated with them. Thus among the **Cataract Knives** (**A 1** to **A 10**) is Beer's knife (**A 7**) which Jaeger his son-in-law presented to White Cooper. **A 4** is a cataract knife ascribed to Frére Côme the French monastic surgeon, which is described by Baseilhac in 1781.

According to a statement made by Benjamin Bell, "M. Daviel, an oculist of Paris, first proposed and practised the method of removing cataract by extraction in 1737, which superseded the old method of couching."

Special cataract knives with mechanical spring and trigger action were introduced by Bécquet, Dumont, Van Wij, Assalini and Eckholdt at the latter part of the eighteenth century. **A 1** is **Guerin's spring cataract knife** invented in 1839. **A 9** is **Guthrie's double cataract knife** which he used himself, and **A 20** is a case of cataract instruments presented by Professor Beer to Guthrie.

A 13 is **Sharpe's couching needle** with a triangular point, similar in type to that used in early times by the Greeks and Romans and also to the instruments used by native Hindu operators. It was employed down to the middle of the eighteenth century. **A 19** is a case of **cataract instruments** presented by Sir James Paget, who states that they were "used by **Mr. Wardrop** (1782-1869), surgeon extraordinary to the Prince Regent." He directed the West London Hospital of Surgery from 1826-1836 and taught at two medical schools. **A 19 a** is a case of **cataract instruments** that belonged to **Sir William Flower,** Conservator of the Museum 1861-1884. **A 29** is Grossheim-Geigér's **Raphiankistron** for coredialysis, a complicated and delicate instrument first described in 1826. This instrument originally belonged to Wm. Long, Master of the College of Surgeons in 1800, and was presented to the museum by his widow in 1818.

A 31 is a case of **Strabismus instruments,** the first used and designed by **C. Gardner Guthrie,** and **A 33 a Anel's lachrymal syringe** that originally belonged to Robert Liston.

A 39 to **A 55** are various types of **Eye specula. A 40 Cheselden-Sharp's,** was invented in 1727. Samuel Sharp, surgeon to Guy's Hospital, was a pupil of Cheselden and the first to describe this instrument in 1734. **A 45** is **Benjamin Bell's original model** and described by him in 1785.

A 52 is **Latta's eyelid retractor,** a curious instrument with a weight which hangs on a wire. He refers to it as " a little broad hook for keeping down the under lid when the eye is to be fixed by the hasta " (a needle mounted on a handle).

Helmholtz introduced the **ophthalmoscope** in 1851, and **A 56 a** to **56 d** are types of early **ophthalmoscopes** that formerly belonged to Sir John Tweedy and bequeathed by him to the museum in 1924.

A 58 and **A 61** are specimens of the **optometers** devised by **Sir John Tweedy,** from the first experimental type.

Section B.

Instruments for Operations on the Ear.

The primitive types of **aural specula** used in the seventeenth century continued to be employed until well into the nineteenth. **B 1** is a specimen resembling that figured by Fabricius Hildanus in 1646. It was not until 1823 that the bivalve forceps-speculum was superseded by the funnel-shape devised by Newburg, which were afterwards improved by Grüber and Wilde. **B 5** is **Hutchinson's lamp** for examining the ear, a type of appliance employed about mid-nineteenth century before the use of electric lighting.

B 10 is a specimen of an **artificial sound magnifier** used for fitting into the ear in cases of deafness about the middle of the nineteenth century. **B 11** is an **Ear trumpet** made for Admiral Sir John Borlase Warren, Bart. (1753-1822). Besides the ear piece it consists of five cylinders made of polished ivory.

Ear Syringes are described by Ambroise Paré in 1579, and are mentioned by Heister in 1743 and Benjamin Bell in 1801. Abernethy in 1828 recommended " syringing the ear if there is wax in it." **B 12** is an **Ear syringe** of brass made about 1790 and before the finger-ring was fixed on the upper cap of the cylinder on each side of the piston, a contrivance said to have been introduced by Weiss. **B 14** and **B 15** are

early types of **india-rubber ear syringes** made about 1800. Rubber began to be employed in England for surgical appliances about 1790, and gum elastic about 1801.

Section C.

Instruments for Operations on the Nose and Nasal Fossæ.

This section chiefly consists of instruments employed for the removal of nasal polypi and **C 2,** which was originally figured by **Fabricius Aquapendente in 1647,** represents the type used until the end of the eighteenth century. A similar instrument was described by Heister in 1743, and Savigny alludes to another in 1798.

C 3 is a type of **nasal polypus forceps** figured by Brambilla in 1782, and was the kind usually employed until the end of the eighteenth century. **C 12** is **Hilton's nasal polypus snare,** the original model for which was designed by Sir William Wilde of Dublin about 1863. About the middle of the nineteenth century, the snare largely replaced the forceps in the treatment of nasal polypus. **C 15** and **C 16** are specimens of **Sir Duncan Gibb's Laryngeal Syringe.**

Section D.

Instruments for Operations on the Mouth and Pharynx.

The value of the **gag** in operations involving the mouth was recognised in the sixteenth century, when the formidable appliances represented by **D 1** and **D 2** were employed. When using the latter type, the lower blade was passed over the tongue and the wedge-shaped "teeth" kept the jaws apart, while the frame formed a window through which the surgeon could operate on the palate or fauces. **D 4** is **Sir Thomas**

Smith's gag which he used when operating on cleft palate in children. **D 8,** called a **"Tooth-edged cutting forceps,"** was originally designed by Sir Benjamin Ward Richardson in 1873, which he used in "dividing directly and quickly, structures in which there are many minute blood vessels." This specimen is a modification by **Arthur Durham,** which he termed **"serrated scissors"** and employed "mainly in operations on the tongue."

D 9 to **D 21** are instruments and appliances used in **hare-lip operations.** Galen describes the treatment of *Coloboma*, as hare-lip was called by the Greeks, and like Celsus does not claim this operation of freshening the edges of the cleft as his own invention. The twisted suture which came to be used in the seventeenth century was known to Guy de Chauliac about the year 1363, who taught that simple suture was not always satisfactory.

D 15 and **D 16** are **Durham's hare-lip forceps,** right and left. Heister notes an instrument of this kind in 1743 and it is probable that they were known before that period. **D 18** is Abernethy's case of **Benjamin Bell's hare-lip pins.**

D 19 a is an instrument for closing recto-vaginal or vestico-vaginal fistulæ originally invented by **William Rawlings Beaumont** (1803-1875), an English surgeon who settled in Canada. This interesting and ingenious instrument is said to have given Singer, who saw a specimen in the window of a surgical instrument maker in New York, the idea embodied in the sewing-machine. **D 22** is a case of **Mason's cleft-palate instruments** and **D 23** a case of **Durham's instruments,** both of which were used by those surgeons.

D 27, D 28 and **D 29** are **raspatories** used by **Lister,** and **D 34** is a **suture carrier** with a sewing-machine action employed in operations for cleft-palate.

D 37 a to **D 37 d** are specimens of **uvulatomes, tonsillotomes** and **tonsil guillotines.** Benjamin Bell mentions an instrument for removing the uvula by excision in 1786, and by the end of that century several types were in use. Philip Syng Physick

improved the uvulatome, and Morell Mackenzie modified the instrument. Fahnestock devised the **Sector tonsillorum** from which the present tonsillotome was evolved, and Guersant, on the suggestion of Velpeau, added the two-pronged fork.

D 38 to **D 39** are samples of **pharyngotomes,** called by Heister in 1743 **paristhotomus,** for opening abscesses in the tonsils. Garengeot attributes the invention of the **Pharyngotome** to **Petit** as early as 1720.

Section E.

Instruments for Operations on the Thorax and Respiratory Organs.

Tracheotomy was known to Paulus Ægineta in the VII century, who devotes a chapter in one of his works to the subject, and Ambroise Paré recommended the operation in cases of severe angina. It was not however practised for the extraction of foreign bodies until the seventeenth century.

E 3 is a **tracheotome** invented by **Sir Henry Thompson** in 1853. This instrument once belonged to **Lord Lister,** to whom it was given by Thompson before he went to Glasgow. It is said to have been a development of one devised by Garin of Lyons, which was exhibited at the Great Exhibition of 1851. Several tracheotomes invented in the early XIX century were later improved and in 1881 **Jacolet** devised his **trocar tracheotome.**

The Romans used a **trocar** very similar in design to some employed at the present day, and a model of one in bronze is shown among the Roman instruments (**T 75**).

From **E 4** to **E 22** are specimens of **trocars** and **cannulæ** illustrating the gradual development of this instrument to the present form of the tapping trocar, as employed for paracentesis of the thorax, abdomen, cystic tumours and hydroceles.

Several of the cases of tracheotomy and laryngotomy instruments exhibited belonged to Arthur Durham, and many of the instruments were devised by him.

E 10 is **Sir William Fergusson's simple tracheotomy tube** which is perhaps the simplest of all patterns devised by a surgeon of eminence. Savigny introduced the split single cannula, and **Andree** devised his **"elastic trocar"** in 1783, in which the cannula is divided into two halves (**E 19**).

E 23 to **E 25** are sets of instruments recommended by the Royal Humane Society at the close of the eighteenth century for **resuscitation of the apparently drowned.** They include a machine for conveying fumes of tobacco or other herb into the intestines, an instrument for inflating the lungs, with bellows and bone pipes for rectal insufflation, flint steel and matches. **E 25** contains the original bill and card of directions for use.

Section F.

Instruments for Operations on the Abdomen and Alimentary Canal.

F 1 to **F 5** are various types of **œsophageal forceps.** The earliest is **Eckoldt's,** described in 1779 as "forceps for the extraction of bodies lodged in the upper portion of the œsophagus." **F 5** was devised by **Bond,** for a special case, for the removal of a brass buckle and a brace strap, which were swallowed by a man when in a state of delirium. The fellow of the buckle is attached to the forceps. Prof. John Wood, who was called to see the patient failed to extract the body. The use for which this pair of straight forceps was specially made failed, as no foreign object could be detected. Sir William Fergusson was consulted on the eighth day, and passed the forceps into the stomach, but did not succeed in reaching the foreign body. At the end of a fortnight, by means of a whalebone probang, he managed to push it into the stomach. Three months later the patient was in good health and free from any sign of obstruction, although no foreign body had been passed from the bowel.

Among the instruments associated with **hernia, F 6** to **F 16,** is a **director** of the late XVIII century. **F 6,** was probably designed by W. Long, Master of the College of Surgeons in 1800. **F 7** is **Sir Astley Cooper's director** which was modified by **Aston Key** in 1827 (**F 8**).

F 12 is **Wutzer's instrument for radical cure of inguinal hernia,** described in 1858 by Sir Spencer Wells.

F 17 to **F 20** are specimens of **trocars for paracentesis abdominis** and are some of the earliest types employed when the cannula was carefully adapted to the trocar.

F 23 to **F 26** are instruments introduced by Desault, Luke, and W. & H. Allingham for the treatment of **fistula-in-ano by ligature,** a method which was practised by Ambroise Paré in 1598.

Among the cutting instruments there are several types of the **syringotome** mainly associated with the name of Garengeot. **F 27** is **Lemere's** modification, which dates from the end of the XVIII century and was presented to the museum in 1818. The shape of the instrument has altered but little since the time of the Romans, who used "a falciform blade with a blunt end." The handle was prolonged into a slender, rounded, sound-like portion with a sharp point. "The narrow point was passed into a fistula, caught, and the whole instrument pulled outwards by means of it, thus dividing the overlying tissues with the falciform blade." This type remained in use till comparatively recent times.

Galen advocated a blunt instrument with only one cutting edge. Paulus Ægineta also alludes to the "point of the falciform part of the syringotome." **Garengeot** described his **syringotome** in 1725, and states "this instrument has been wrongly neglected for the bistoury." His type (**F 27**) has a silver probe-like extremity and was bent backwards, very sharply, to make a thumb-piece. **Percival Pott** described his **fistula knife** (**F 30**) in 1765, and remarks, "it is the curved probe-pointed knife with a narrow blade I have always found to be most useful." A modification with a sliding guard

along its back is represented in **F 34.** Other types after Cruikshank and Savigny are represented from **F 31** to **F 37.** The **probe scissors** for incomplete fistula-in-ano (**F 39**) were invented by **John Freke** and described in 1738.

The **anal specula** which follow are instruments employed for the treatment of hæmorrhoids, and types chiefly used about 1875. The anal specula used in early times were of the handled bi-valve type similar to the vaginal, the evolution of which is represented in the cases on Stand " A."

Sir William Fergusson claimed to be the inventor of the **tubular rectal speculum** (**F 45**) and states he " invented the glass vaginal speculum many years earlier," but the latter claim is disputed, as it appears that a vaginal speculum of similar type devised by Robert Ferguson, of King's College, was in use in 1866.

F 53 is a **pewter enema syringe** for self-use which belonged to P. J. de Loutherbourg, R.A., a well-known artist of the XVIII century, who turned quack-doctor and lived at Chiswick (1740-1812).

F 53 h is a type of **syringe** called an **elastic bottle,** which was commonly used during the last half of the XVIII century.

Section G.

Instruments for Operations on the Genito-Urinary System in the Male.

This important section covers the whole range of instruments employed in operations on the genito-urinary system, and begins with various types of **catheter.**

This instrument dates back to antiquity and was employed both by the Greeks and Romans. Among the surgical instruments found in the " house of the physician " at Pompeii, was a bronze catheter with two gentle curves, a model of which may be seen in **T 75. 37.** It is a male catheter of about No. 11 calibre (English scale), and nearly 9 inches long. Galen

alludes to the catheter as being shaped like the Roman letter "S," and this shape survived until the XIX century. In the XVIII century silver catheters were generally employed.

Bougies go back to even an earlier period and were used by the **Egyptians** over 3,000 years ago. Bougies of wax or other substances, often medicated, were employed throughout the ages and a bundle used by **Abernethy** (**G 25**), shows how they were made until the XIX century. Linen was the basis of the bougie, which was impregnated with a composition usually made of wax, oil and resin, whilst a salt of lead was sometimes added. This composition was spread on the linen, which was then cut into strips from 6 to 10 inches long by $\frac{1}{2}$ inch or more wide, then rolled into cylindrical form. More recently they were composed of catgut, gum-elastic and flexible metal. **G 9** is a box of **silver catheters** and a metal flexible bougie that belonged to Abernethy. It includes **Symth's** highly flexible cast metal bougie. **G 19** and **G 20** are specimens of **Smyth's catheters** introduced in 1804, and **G 14** is a silver catheter of high calibre used by Sir William Fergusson, who observed in 1870, "I use and recommend the silver catheter as preferable to all others."

G 15 is a silver catheter with **"Key's curve"** and **G 16** another silver instrument with **"Lawrence's curve."** **G 23** is a **telescopic catheter** invented by Winchester about 1870 and **G 28** is **Sir Benjamin Brodie's rigid metal bougie** which he employed in stricture of the male urethra, while **G 31** is **Eldridge's "Pathfinder"** described in 1881 for facilitating the diagnosis and treatment of strictures of small calibre. From **G 34** to **G 37** are various types of **Urethrotomes** and **G 40** is a set of **Wakley's stricture dilators** first described by him in 1851.

Instruments Employed for Removing Calculi

The collection is especially rich in instruments, dating from the XVIII century, for the treatment of stone in the bladder.

Among the historical sets are instruments used by **Sir Astley Cooper** (**G 49**), **Joseph Swan's** case presented to him by Astley Cooper and Henry Cline in 1812 (**G 50**), a case of lithotomy instruments that belonged to and which was extensively used by **Aston Key,** nephew of Sir Astley Cooper, which also contains the **lithotomy knife** designed by him (**G 50 a**).

G 51 a is a set of forceps, scoops and a sound used by **Sir William Fergusson** in 1850. **G 52** is the sound with angular curve, devised and used by **Sir Henry Thompson** and from **G 54** to **G 66 a** are various other types of sounds employed from the XVIII century.

Among the **lithotomy staffs** are those of **Le Dran** devised about 1710 **G 67,** a set of **Cheselden's** about 1731 **G 69,** and many other types are shown from **G 70** to **G 86. G 87** is **Benjamin Bell's lateral grooved lithotomy staff** which he devised in 1787, for the purpose of passing the gorget more easily into the bladder than when the groove is on the convex part of the instrument.

The **safety staff** was first devised by **Sir James Earle** in 1796 and was afterwards improved by **Guerin and Klein** (**G 92**).

Following these are the **lithotomy knives** of which there are a great many varieties and types from **G 94** to **G 125. Garengeot** described his knife which was to be used with the gorget in 1725. **Cheselden's knife** (**G 96**) was described by Douglas in 1731. **Liston's knife** (**G 97**) is a large, strong scalpel and **G 98** is a case containing five lithotomy knives used by **Sir William Blizard** in practice at the London Hospital. **G 102** is the type of knife employed by **Sir William Lawrence** and **G 108** the instrument used by **Sir William Fergusson** in hospital practice about 1850. He used to cut a small notch in the handle each time he used it and this instrument has twenty-nine marked in the ivory end. **G 115** is **Astley Cooper's modification of Blizard's knife** and **G 127** is a sample of **Frère Côme's Bistouri Caché**, which the friar-lithotomist devised about 1760 for his special method of operating.

G 130 is **Le Cat's Cystotome** described in 1749, and **G 131** his lithotomy knife and urethrotome. **G 137** is **Paré's dilator** figured by him in 1578, but it practically ceased to be used in the XVIII century. This dilator was a prominent feature in the performance of the barbarous Marian operation or "lithotomy by the apparatus major."

Gorgets.

Lateral lithotomy was practised by **Pierre Franco** before the middle of the XVI century, and the **Gorgeret** he devised as a guide to the forceps, together with his knife mounted on a handle like a razor and a grooved lithotomy staff, was figured in 1561. There were few instruments of the XVIII century which varied so much in shape as the **Gorget,** as may be judged from the many types exhibited. A gorget with a probe-like beak is described by Fabricius Hildanus in 1640 as a "conductor" or "semi-speculum." **Cheselden's gorget** (**G 141**) was blunt like Franco's, while the instrument devised by **Cæsar Hawkins** was sharpened on the right edge. It was slowly discarded in the XIX century, and the blunt gorget also began to fall out of use. There were many modifications of both these types introduced in the XVIII century, of which numerous examples are shown.

Sir Charles Bell writing in 1826 says, "some years ago I collected nearly twenty gorgets from the different shops in London, all differing in form in the shape of the cutting edge."

It will be noticed that there are three distinct types of this instrument, viz., the **blunt,** the **beaked** and the **cutting gorget,** each of which have various modifications.

G 140 is **Garengoet's** gorget described in 1725, **G 141** and **G 141 a** are specimens of **Cheselden's,** used about 1740, **G 148** is **Cæsar Hawkins' cutting gorget, G 154 Benjamin Bell's, G 158 Blicke's, G 165 Scarpa's, G 166 Cruikshank's, G 168 Cline's, G 173 Abernethy's** and **G 180** is **Astley Cooper's.**

Among the unconventional types are **Bromfield's double gorget** (**G 186**), a blunt and a sharp instrument sliding on each other, and **Monro's** (**G 189**), a **double-bladed gorget.**

There are also **Jeffray's** (**G 191**) in which a blunt and cutting gorget are connected together operated by a spring, **Cline's gorget** with a sliding lancet (**G 192**), and **Le Cat's gorgeret cystotome** (**G 195**), which was one of the most complicated types invented.

Lithotomy bladder searchers, for introduction into a perineal lithotomy wound, when there was any doubt about the presence or position of one or more calculi, are represented by **Benjamin Bell's** (**G 197**) and **Edward's** (**G 198**) instruments.

Among the **stone crushing forceps** used when the calculus proved too large to be safely drawn unbroken by the forceps, are **Le Cat's** (**G 199**), a powerful steel instrument. **G 202** is a massive instrument made for **Sir Benjamin Brodie,** and **G 203 a** is **Dupuytren's** stone-crusher with drill, introduced about 1824.

Lithotomy Forceps.

Forceps employed in lithotomy form an important part of this collection. Celsus, in his description of the operation of the apparatus minor, "cutting on the gripe," mentions a hook, but from the time of Lanfranc and Guy de Chauliac, forceps were employed for extracting calculi. Marianus appears to have been the first to apply the name to the instrument used in lithotomy. Franco in 1561 calls it **tenailles** and Paré **tenailles en bec de cane,** as distinguished from the **bec de corbin** for stone crushing.

G 207 is a case containing seven **Cheselden's forceps** of various sizes which date from about 1731. No. **7** in the set were Cheselden's favourite pair, and it is said he seldom used any others. This pattern remained popular with expert operators down to the middle of the XIX century. The earlier types have three or four blades as **G 219,** which are figured by Paré in 1579. Several operators devised forceps with a net attached to the blades such as Le Cat's and those used by Sir Everard Home. **G 221** is a **four-bladed lithotomy forceps,** said to have been designed by **Aston Key** and presented to the Museum by Sir Charles Blicke in 1811.

Lithotomy Scoops and Spoons.

Pierre Franco, describes the scoop which he employed in 1556, and Ambroise Paré mentions that after extraction of the stone by the Marian operation, "a sound with a scoop at the opposite end of its handle should be introduced, so that the operator may make sure that there are no more calculi." Fabricius Hildanus figures two instruments of this kind in 1640, one smooth and the other roughened, and the instruments of a later date fall into these categories. The smooth type were sometimes called a **spoon** and the roughened a **hamula,** such as Savigny's (**G 226**) figured in 1798.

Lithotrites.

There are numerous varieties of lithotrites, drilling instruments and crushers exhibited, many of which are associated with the names of their inventors.

Among the primitive instruments is **Jacobson's crusher** (**G 233**), an ingenious instrument invented by the Danish surgeon of that name, and **Luken's Litho-Konion** or **basket forceps,** described and devised by Isaiah Luken of Philadelphia in 1825.

G 232 is the pyriform and slightly roughened end of a steel sound, by means of which, a General Martin was under the impression that he succeeded in breaking up a calculus in his own bladder when in Lucknow in 1783.

The **drilling instruments** are represented by a complete set of those invented by **Civiale** which were made in Paris in 1830. The fine set in a case (**G 239**) should be compared with **G 241** which shows the whole instrument mounted and ready for use. **G 261** is **Heurteloup's Perce Pierre** or drill, described by the inventor in 1831, and **G 262** is **Tanchou's drill** introduced in 1830. **Heurteloup's percussor lithotrite** (**G 268**) shows an advance on the previous instruments, and its advantages over the drilling lithotrites were described by the Baron Heurteloup

in 1833. This was one of the original models and was brought from France and presented to the Museum by Sir William Fergusson, Bart.

The curious instrument called Offord's **Trigger Percussor** (**G 273**) was made by a mechanic of Stowmarket in 1833. He brought it to Guy's Hospital and demonstrated it to Aston Key, who tried it on a child 8 years old, but it did not prove satisfactory. He afterwards made for Mr. Bryan, a surgeon of Stowmarket, an improved instrument (**G 274**) which was known as **Bryan and Offord's Injecting Lithotrite. G 276** is the first **male rack and pinion lithotrite** used by Liston and Sir William Fergusson, which is constructed to allow of percussion if preferred. It was figured and described by the latter surgeon in 1835 and was presented to the Museum by him.

G 277 to **G 283** are a series of instruments made by Sir William Fergusson illustrating the development of the **lithotrite,** the first being the original wood model of the screw type carved by himself. **G 284** is the French modification made by **Charrière,** and **G 287** is **Civiale's lithoclaste,** the last pattern made. From **G 289** to **G 300** are a series of instruments made for **Sir Benjamin Brodie** showing various modifications carried out by Weiss. They were presented to the Museum by Sir Charles Hawkins in 1882. **G 302 a** to **G 302 e** are specimens of **Sir Henry Thompson's lithotrites,** the first being described by him in 1888. He claimed the cylindrical handle as his own suggestion. **G 302 f** is **Bigelow's lithotrite** introduced in America in 1878. Lord Lister had a replica of this instrument made for his own use which is exhibited in the case with his instruments in Room 1.

The **urethral forceps** of the **Astley-Cooper—Weiss** pattern (**G 309** to **G 321**) are grouped with modifications by Brodie and Fergusson. **G 325** is **Sir William Blizard's urethra forceps** with three blades, for extracting small calculi. **G 335** and **G 336** are instruments used for **suprapubic lithotomy** and **G 337** to **G 339** forceps for operations on bladder tumours.

Section H.

Instruments Employed in the Treatment of Vesical Calculus in the Female.

These comprise a **female bladder sound** (**H 1**) of the late XVIII century, four **female lithotomy staffs** (**H 2**) and two **female lithotomy staffs** (**H 3**) of the same period, the last specimen (**H 4**) being a pattern of a later date.

Obstetrical and Gynæcological Instruments.

The evolution and development of the obstetrical forceps is one of the most interesting stories connected with the history of surgical instruments. It begins with mystery, as for generations the secret of their shape and form was closely guarded by the descendants of William Chamberlen their originator.

William Chamberlen was a Huguenot refugee who sought shelter in England with his wife and three children, and landed at Southampton in 1569.

Little is known of the family for some years afterwards, but it is probable that William Chamberlen practised medicine, for the son of the younger Peter speaks of having been " nursed up as from the cradle to all the parts of Physick." He had two sons called Peter, both of whom became barber-surgeons and famous as men-midwives. Peter the elder eventually became a Fellow of the College of Physicians, and in 1628 was Court Obstetrician to Queen Henrietta Maria. Peter the younger became a barber-surgeon and was licensed to practice midwifery by the Bishop of London in 1600.

From this period to the end of the XVII century the father and sons became famous as men-midwives and jealously guarded the secret of their success. Apparently as early as 1634 it was known that the Chamberlens used special " instruments of iron," so they must have employed their forceps some years previous to that date.

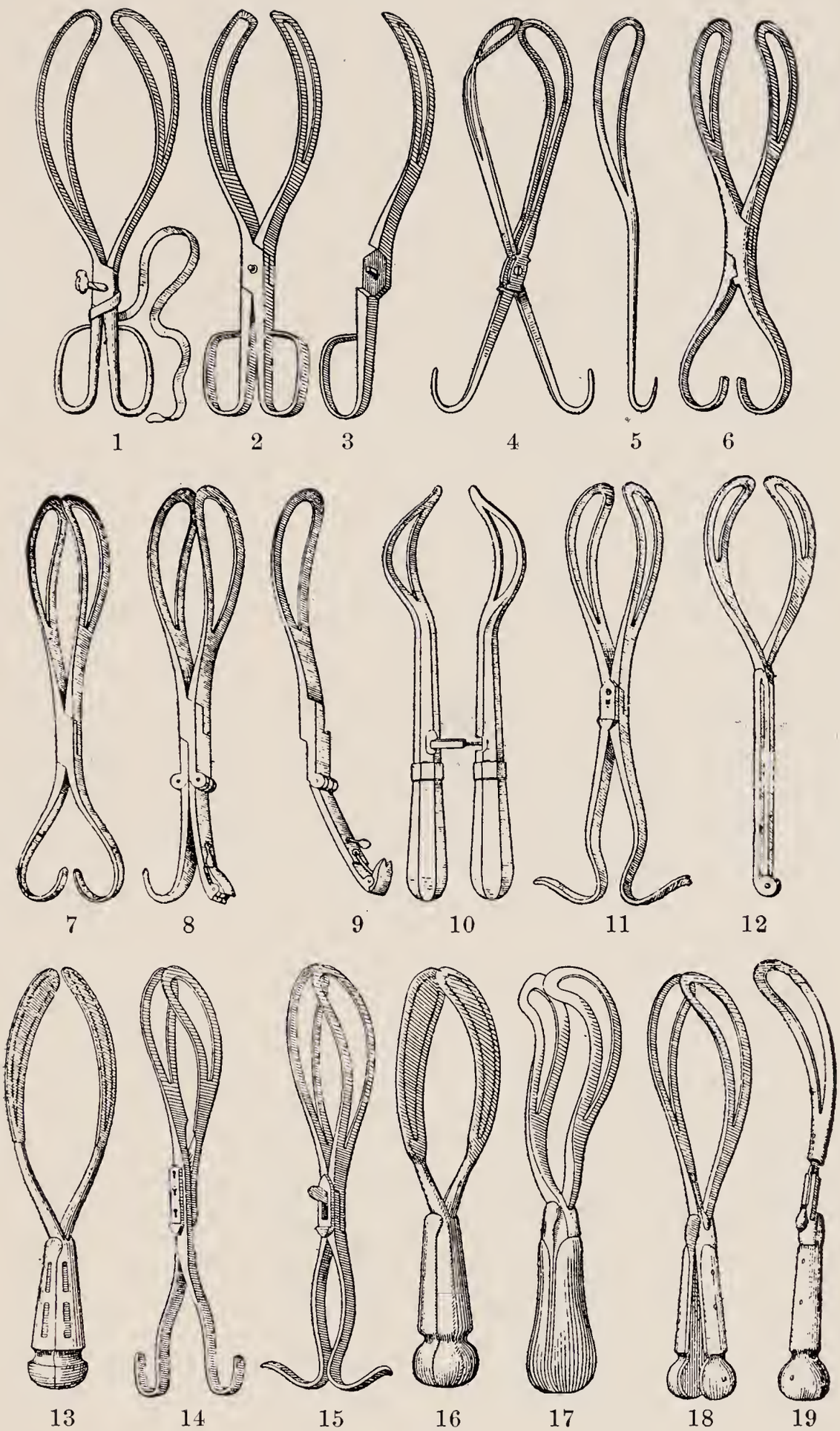
In 1683, Dr. Peter Chamberlen of the third generation, died at Woodham Mortimer Hall, Essex, where in 1813, a set of the obstetrical instruments were discovered between the floor and ceiling of an upper closet.

These historical relics, which consist of four pairs of iron forceps, levers, crochets and fillets, are now in the possession of the Royal Society of Medicine.

It was not until the beginning of the XVIII century that the secret of the Chamberlens became generally known, and the idea of improving the forceps was seized upon in England, France and Holland. Various new types followed in quick succession, and in 1720, **Palfyn** exhibited his **" mains de fer "** before the French Académie Royal des Sciences. **Gifford's Extractor** probably came next in 1726, and in 1733 **Dusée's forceps** were shown in Edinburgh (No. **1**). The blades were double-jointed with a pivot that was removable so as to fit either joint. **Chapman** mentions the forceps he designed with curved-in handles in 1735, and to him is probably due the invention of the " English lock " (without screw or pivot) which was later perfected by Smellie.

Freke, surgeon to St. Bartholomew's Hospital, devised an improvement of Gifford's Extractor in 1734 by giving it a folding handle, and **Burton** of York (introduced as Dr. Slop in Tristam Shandy) invented his forceps about 1738. They were followed by **Mesnard's tenettes a cuiller,** which had blades that crossed and were described in 1743. In 1744, **Smellie,** a Scotsman, who had been a naval surgeon, settled in Downing Street, London, and introduced a short wooden forceps cut out of box-wood (No. **3**) the blades of which locked into one another, a contrivance that was afterwards known as the **" English lock."** In 1746, **Grégoire** invented his forceps (No. **2**), and he was followed by **Levret** who introduced the pelvic curve in the long blades in 1747 (No. **5**).

Meanwhile, Hugh Chamberlen, Senior, a descendant of the Chamberlen family who had settled in Holland, is said to have sold their secret to five obstetricians of Amsterdam, and the



OBSTETRICAL FORCEPS OF THE XVII AND XVIII CENTURIES.

Figs. 1–5. Chamberlen's forceps and vectis ca., 1600; fig. 6. Giffords' extractor, 1726; fig. 7. Chapman's forceps, 1735; figs. 8–9. Freke's, 1734; fig. 10. Mesnard's, 1741; fig. 11. Grégoire's, 1746; fig. 12. Rathlauw's, about 1747; fig. 13. Pugh's, 1754; figs. 14–15. Levret's, 1747; fig. 16. Smellie's, 1752; fig. 17. Johnson's, 1769; fig. 18. Fried's, 1770.

outcome were the forceps introduced by **Rathlauw** in Holland with long handles and short blades and the forceps of **Ruenhuysen.** In 1747, **Schlichting** described a forceps similar to Rathlauw's first pattern, and **Bing** of Copenhagen followed in 1750 with his non-fenestrated forceps, with long detachable handles. Smellie first described his long curved forceps in 1751 and covered the blades and handles with leather, a practice which Burton rightly condemned. **Paulus de Windt,** a pupil of Palfyn, introduced a forceps with solid blades without joint or lock about 1752, and in 1754, **Pugh** of Chelmsford records that "he had invented a forceps fourteen years previously."

In 1769, **R. Wallace Johnson** invented the forceps with the perineal curve, and in 1770, **Fried** introduced an instrument with blades similar to Levret's but with Smellie's handle and lock.

Leake of Westminster Hospital introduced an innovation in his three-bladed forceps in 1774, and in the same year **Petit** invented a forceps with a rachet on the inside of the handles to lock the blades. Three years later **Van de Laar** of The Hague invented his forceps with axis traction, operated by drawing directly from the blades by means of a straight rod, which was followed by those devised by **Coutouly** in 1777.

In 1781 **Péan's** forceps adapted by Baudeloque were introduced, and in 1782 **Lowder,** in one of his lectures, mentions **Orme** as modifying Smellie's forceps, as "he thought he could improve them by making the blades rounded and wider to suit the parietal bones." The blades of Orme's original forceps (No. **6**) were covered with leather. No. **7** shows the characteristics of the forceps devised by Orme as modified by Lowder. No. **8** is another pair of **Orme-Lowder forceps.** In 1783 **Sleur** described his **vectis** and double-vectis which could be used as forceps, and **Young** of Edinburgh and **Evans** of Oswestry introduced instruments of the Wallace Johnson type in 1784.

In 1786, **Aitken** described his graduated lock, in which "a wide space was left between the shanks of the blades for the obstetrician's middle finger, while there was a blunt knob on the upper border of each handle, close to the lock, on which the fore and ring-finger rested."

Mathias Saxtorph of Copenhagen described his forceps in 1791, and in the following year **Osborn** introduced his forceps, which were short, yet had a pelvic curve like Levret's and were much lighter. In the same year **Thynne** introduced similar forceps but with longer blades and shorter handles than Osborn's.

Denman introduced his forceps in 1793 (No. **11**) and they remained in use for many years afterwards. Following these came **Hamilton's jointed forceps** (No. **12**), and about the same date, those of **Rawlins** of Oxford, whose **Brachium forcipis** is commended by Mulder.

In 1796, **Busch** published an account of his forceps (No. **14**) the first that bore flanges or finger rests. These were originally covered with black rubber, a practice said to have been introduced by **Osiander** at the end of the XVIII century. Then followed the forceps of **Dubois** in 1791, of **Santarelli** in 1794, and of **Weisse, Wrisberg, Mulder, Eckardts, Mayer, Wegelin** and **Boer.**

In 1802, **Brunninghausen** introduced his forceps with long curved handles, finger grips and a fixed pivot lock which was afterwards favoured in Germany.

Following Brunninghausen's came the instruments designed by **Thénance, Siebold, Froriep, Fries, Lauverjat,** and **Jörg. Wigand's** were introduced in 1812, and **Veit Karl's,** which had a bar between the fenestrated handles, in the same year.

Early in the XIX century **Assalini** introduced his **forceps** made entirely of metal (No. **13**). The blades are not crossed, and the handles which curve inwards at the lower extremities form hooks which face each other. They were originally made with solid, spoon-like blades.

No instrument has varied so much in shape and design as the midwifery forceps and from the beginning of the XIX century many new types were introduced, the inventor's names of which need only be mentioned.

Mursinna's forceps (No. **15**) a powerful instrument of the Levret type, was first described in 1803, and was followed by **Conquest's** (No. **16**), notable for a screw arrangement by which the upper blade could be detached from the handle. Other instruments were introduced about this period by **Weissbord, Maygrier, Salomon Guillon** (1825), **Horn** and **Mende** whose instrument is noteworthy for its long handle.

Nos. **17, 18, 19, 20** and **21** are specimens of the various forceps devised by **David Davis.** No. **22** is **Blundell's long forceps** with straight blades, and No. **23 a** the forceps devised by **Ramsbothom,** which were known as the "long forceps."

Nos. **25, 26, 27** and **28** are specimens of the short and long forceps invented by **Sir James Y. Simpson,** and No. **29** those of **Naegele** introduced in 1853. **Rigby's forceps** with the Brünninghausen lock were described by him in 1841, as "the most perfect lock of its kind." No. **30** are **T. E. Beatty's medium forceps** described in 1842, **Clark's** (No. **30 a**) a very light, short forceps introduced about 1850, **Martin's** (No. **31**) and **Radford's** (Nos. **32**, **33** and **34**) with asymetrical and symmetrical blades.

Nos. **35** and **36** are specimens of **Waller's forceps,** and No. **37** are **Greenhalgh's** short straight forceps, with the shanks bent strongly outwards so as to form a finger-ring. No. **39** are **Churchill's,** with long and slender blades described in 1841, and Nos. **40** and **41** are specimens of **Graily Hewitt's,** which he described in 1861.

No. **42** are **Kristeller's dynamometrical forceps** introduced in 1861, and No. **44** are **Gayton's,** with a spring rack and a lock which he states, "provides a suitable means of uniting the forceps when applied without the incumbrance of ligatures."

Rizzoli's forceps (No. **45**), a large heavy instrument, was constructed so that either blade could be introduced first.

Pajot's forceps with disarticulating blades (No. **50**) were much used in France, and **Lazarewitch's** with pelvic curve and straight long blades, are represented in Nos. **52, 53** and **53 a.**

About 1860, **Killian** introduced a double-bladed forceps the handles of which could be secured by a bar. Then followed the forceps of **Bernard, Tarsitani, Trélet** and **Zeigler's** with straight shanks to blades and finger rests, **Simpson's long** and **short** forceps with diminutive handles, **Bird's** with a ring, and those of **Harper, Waller** and **Pagan. Inglis** introduced an instrument with short squat handles and it was followed by **Madden's, Braithwaite's, Murphey's, Galabin's** with bent shanks, **Clark's** and **Hamond's** in 1867. In 1868 **Morales** designed an instrument with bent back handles and **Chassagny** a forceps with blades that locked.

Aveling's forceps were claimed to be the first made with the handle curve and were the forerunners of the **axis-traction forceps** afterwards introduced by **Tarnier.**

Barnes' forceps with finger-ring (No. **54 a**) were introduced in 1870, when he was obstetrical physician to St. George's Hospital, and **Vacher's** cross-handled forceps (No. **55 a**), which did not prove satisfactory, in 1873.

Tarnier's axis-traction forceps (No. **56 b**), much used on the continent, were introduced about 1877, and were followed by improved patterns by **Lusk** and **Mathieu.** They were modified by Sir A. R. Simpson in 1883, who laid stress on the importance of easy locking and interlocking of the traction rods which he states was attained by his locking plate. **Brens** also introduced a traction forceps in 1882 and **Sanger** invented an attachment to the ordinary blades for traction.

The four **whalebone fillets** (Nos. **67** to **67 c**) are associated with the more recent history of a contrivance that has again become popular.

Barnes' dilating bags (No. **72 a**) for the primary dilatation of the cervix were designed in 1862, and Nos. **73** to **86** illustrate various types of **perforators.**

Craniotomy forceps are represented from Nos. **90** to **103.**

The formidable **cephalotribes,** from Nos. **108** to **119,** begin with **Assalini's,** who invented the earliest instrument for crushing the bones of the fœtal skull, which was called the **compressor forceps. Baudelocque's** massive cephalotribe (No. **110**), which weighs nearly five pounds, is the original instrument used by the inventor from 1829, for which the Académie des Sciences awarded him 2000 francs.

Various types of **pelvimeters** are represented from Nos. **147** to **159,** and **ovariotomy clamps,** now obsolete, from Nos. **173** to **190.**

Ecraseurs, beginning with **Chassaignac's chain,** are represented from Nos. **203** to **213,** and **metrotomes,** which Simpson called "a kind of concealed bistoury," from Nos. **218** to **229.**

Following the **uterine sounds and dilators** from Nos. **235** to **246** are the

VAGINAL DILATORS.

A series of instruments showing the evolution and development of the vaginal dilator or speculum are shown in the cases on **Screen A.**

The **vaginal dilator** called **speculum** is an instrument of considerable antiquity, and is believed to have had its origin in the fingers of the obstetrician's hand, first placed together in the form of a cone and then with the fingers distended for exploration. Dilators of wood, lead and tin are mentioned by Hippocrates (400 B.C.).

The author of the Hippocratic treatise on the diseases of women, describes dilators consisting of six pieces of pinewood, each being a little longer than the other. They were to be well smeared with oil before being introduced.

The Romans employed dilators of bronze with three or four blades, opened or closed by a central screw, as shown in the model of an instrument of the first century found at Pompeii.

Albucasis, the Arab physician, in 1122, describes a dilator of wood with two blades operated by screws, to open the

vulva, and in 1363, Guy de Chauliac recommends the surgeon to use the instrument called speculum, which is provided with a thumb-screw to dilate the vagina.

Gersdorff in 1526, and Rueff in 1554, describe a three-bladed instrument called the "speculum matricis, or the looking-glass of the matrix, to be used when children sticking in the wombe, being dead, are to be brought forth and so expand the vagina."

There is evidence that a mirror was first employed with the dilator at this period.

Ambroise Paré, in 1579, describes and figures two dilators with three blades of similar design, which he recommends to be "used for inspection of the matrix."

Scultetus, Fabricius Aquapendente, Mauriceau and other writers of the XVII century, describe dilators with three blades, to be used "when the dead child is to be cut out or some ulcer of the matrix is to be viewed."

The large speculum with long sharp blades, is a model of an English instrument of the XVII century in the Prujean Collection, given to the Royal College of Physicians in 1653.

In 1753, Heister figures a two-bladed instrument or bi-valve speculum "to dilate the anus or vagina," and later, Weiss and Plum made a three-bladed instrument actuated by a screw-handle, a type which survived until 1836.

In 1833, Ricord devised a speculum which formed a link between the valve and the tubular instrument and eventually developed into the split tube type called the "duck's bill." In 1836, David Davis introduced a more clumsy instrument with four valves, and in 1842 Recamier and Segalus invented the split tubular with four valves, one of which only functioned. Rizzoli and Cusco simplified it later on, and designed one with two valves of the duck's-bill type.

Beaumont, Magenty and Colombat reverted to the Hippocratic type, and the former designed an instrument with five or six short flat blades attached to a metal ring. Beaumont, who was an ingenious inventor, published a description of his "New Speculum Vaginæ" in 1837.

Various types of tubular specula were designed by Dubois, Horne, Charrière and others about the middle of the XIX century.

About 1855 Robert Ferguson, the first professor of Obstetric Medicine to King's College, employed a tubular glass speculum. In 1870, Sir William Fergusson alludes to it as " the speculum that he devised," which is still in general use, so the origin of the tubular speculum of silvered glass, sometimes coated with gum elastic, is somewhat uncertain, but evidence points to Robert Ferguson as the inventor.

Marion Sims introduced his double-sided duck-bill speculum in 1845, and states that the shape was suggested to him by the handle of a pewter gravy spoon which he used as an improvised instrument.

Nos. **287** to **292** are specimens of **uterine sounds,** and Nos. **309** to **312** illustrate types of **uterine scissors** together with a series of **female catheters.**

Nos. **343** to **347** are five interesting types of **transfusion apparatus. Blundell's** was described in 1825, **Bellini's,** in which the piston is discarded, in 1869. **Fergusson's,** which was a modification of **Collin's,** about 1870, **Graily Hewitt's** in 1864, while **Caselli's** was introduced about ten years later.

Section I.

Instruments for Operations on the Extremities.

The earliest form of knife employed for excising, judging from the instruments depicted by Albucasis in the XII century and by Andrea della Croce in the XVI century, had the blade curving backwards to a point, or a straight blade with a bow-shaped cutting edge.

In the XVII century the knife used for excising limbs underwent a radical change in the shape of the blade and instead of the cutting edge curving outwards, it was curved inwards. It sometimes had a double edge, as represented in I **10,** which is figured by Fabricius Hildanus in 1646. A

specimen of a straight-bladed knife with an ivory handle, which was probably used for the amputation of large cancerous mammæ in the XVII century, is shown in I **11.**

A typical curved amputation knife, the handle of which bears the name and date "George Horsnell 1682," may be seen in the case of instruments, I **1.**

I **12** is a **straight amputation knife** for the thigh, that dates from the early XVIII century, the blade of which is of an unusual shape. **Sharpe's curved amputating knife,** I **13,** is typical of the instrument used in the XVIII century, and was described by him in 1739. I **16** is a specimen with a **double-edge,** and I **17** is **Perret's knife with periosteal elevation,** figured in 1772, which he used for amputating the arm and lower extremity of the knee. I **19, Loder's** amputation knife, is of the transitional period, between **Sharpe's** and **Liston's,** and dates from 1784. **Weiss' knife,** for circular amputation, represented in I **20,** and I **21** is an amputating knife for making a triangular flap to be used in either hand. **Lisfranc's double-edged amputating knife,** which he described in 1845, is represented in I **22.**

I **23** is a case containing two of the long straight amputation knives introduced and favoured by **Robert Liston.**

The **catlin,** a smaller and shorter knife, usually with straight blade and dagger-point, used for dividing the interosseous spaces is represented by **Brambilla's** type with double-edge and **Loder's** scimitar-shaped catlin, which is sharp for three-quarters of the blade. The latter was known as **"Loder's interosseous knife."**

Saws have been employed from a period of great antiquity. The ancient Egyptians employed saws of flint and the Romans used bronze, while iron saws are figured by Albucasis in the XIII century. The large saws used by the Italian and French surgeons in the XVI and XVII centuries, with mounts of chiselled steel and carved ebony handles, were often beautiful specimens of the surgeon-cutler's and wood-carver's arts. The **tenon saw** with deep blade, such as is used by carpenters,

came into use in the latter half of the XVIII century. Percival Pott dispensed with the bow-saw and favoured the tenon-saw, and Assalini commented on its advantages. From I **27** to I **31** are specimens of **bow-saws** of the early XVIII century, and I **35** to I **37** are **chisels for amputation of the hand** as figured by Scultetus in 1674. I **38** is **Scultetus' bone forceps,** and I **39** **Soligen's large cutting pliers for bone.**

Of the nine cases of amputating instruments exhibited, the earliest is I **1** which dates from 1682, while the others are of historical interest. I **2** is a **French army surgeon's case** in use at the end of the XVIII century. It originally belonged to a surgeon of the 69th demi-brigade of the French Infantry, who was killed by a cannon-ball at Fort Mirabout, near Alexandria, on the 19th of August 1801. I **3** is a **Naval surgeon's case** as used in the British Navy in the late XVIII century. It originally belonged to Mr. Joseph Bellot, R.N., who was house-surgeon to Westminster Hospital in 1787. He entered the service in 1789, and received a commission from George III in 1795. I **5,** which dates from about 1770, was formerly the property of Lord Lister, who probably received it from Professor Syme. I **6** is an unusually handsome case of amputating instruments of fine steel with agate handles. The large tourniquet of Heister's pattern shows excellent craftsmanship. I **7** is a case of **amputating instruments that belonged to Sir Astley Cooper, Bart.,** and contains two saws, three knives with ivory handles, tenaculum and tourniquet. I **8** is a case of amputating instruments made of Wooltz or Indian steel by Stodart, 1818, the maker of John Hunter's lithotomy knife. **Wooltz** or **ooltz** was the coarse steel from which swords and other weapons were made in India. The knives originally belonged to Sir Anthony Carlisle.

The **British army surgeon's case** (I **9**) was used in the first Afghan war, between 1831 and 1843, and has an interesting history. It belonged to Dr. Robert Hope Alson Hunter, surgeon to the Queen's Royal Regiment (2nd Foot), and was carried by him when he marched with the force under Lord

Keane which advanced on Kabul through the Bolan Pass and returned with General Sir Thomas Wiltshire by Quetta and Kelat.

The development of the **artery forceps** from the tenacula and double hooks of the XVIII century, is shown from the specimens I **44** to I **59.**

I **44** is **Sir Charles Bell's tenaculum,** concerning which he stated in 1807, " The tenaculum is an instrument in common use for drawing out the artery in open wounds, so as to enable the surgeon fairly to tie its mouth. I have given what I conceive to be the necessary curve to it, making the curve a little more acute towards the point."

I **48** are **Assalini's tenaculum forceps,** a mouse-toothed instrument with a fixed bar. I **49, Wardrop's,** introduced in 1834, and I **50 Liston's,** largely used in Great Britain, especially in Scotland down to the end of the XIX century. I **52, Dieffenbach's " Bull-dog " artery forceps,** is a small but powerful instrument first described in 1845. I **55** are **Luke's** and I **57 Wakley's,** the latter is a spring forceps designed by T. H. Wakley, eldest son of the founder of 'The Lancet,' which was popular with English surgeons until the **pressure forceps** (I **58**), invented by **Sir Spencer Wells,** were introduced and eventually superseded them.

The Tourniquet.

The history of the tourniquet goes back to the last half of the XVII century, when Morell first used his field tourniquet at the Siege of Besançon in 1674.

In 1564 Ambroise Paré practised ligature of the arteries, but held with Hippocrates, it was good to allow blood to escape ; then he secured the vessels with his **becs de corbin,** which were not furnished with a spring until his later days. Thus the actual cautery was superseded.

Morell's appliance was a simple cord without a pad, which was tightened by twisting it with a piece of wood like a pencil. In 1678 **Young of Plymouth** claimed in a pamphlet, that for several years he had employed a true " garrot " in amputations.

"A hard linen wadd was placed over the vessels and held in place by a towel passed around the limb, its ends being tied together. The towel was then made tighter by a batton or bedstaff."

Many improvements soon followed on these primitive appliances. **Zittier** modified the garrot, and the rack and clip mechanism was introduced, which was followed by the axle type. **Screw tourniquets** were afterwards introduced by **Parsons** and **Petit,** and they superseded the older types and still survive. Petit described his invention before the Académie Royale des Sciences in Paris in 1718, and was the **first to use the name tourniquet.** With his instrument the pressure was limited to the artery and could be held on without special assistance. By means of the screw arrangement, relaxation of pressure, in order to ascertain if no vessel remained unsecured by ligature, was simple, and the screw could be tightened at once if spouting occurred. Petit's instrument eventually succeeded the garrot.

Two tourniquets of the **strap and buckle type** are shown in I **60** and I **61,** both of which were used in the Crimean War in 1854.

I **63** is **Savigny's field garrot tourniquet** figured in 1798, and like Zittier's, had a handle mechanism to turn it in place of a separate stick. I **66** is a specimen of **Knaur's axle tourniquet** described in 1796, and I **68** is **Pallas's instrument modified by Freecke.** I **70** is **Usher Parson's screw tourniquet** invented by him in 1819. From I **71** to I **73** are specimens of **Petit's in wood and brass.** I **75** is **Perret's modification of Petit's,** bearing pins to prevent rotation of plates. I **77** is **Ehrlich's artery compressor** described in 1795 and I **78 Davy's lever** for compressing the iliac artery through the rectum, described in 1877. Introduced into the rectum, it was made to press on the common iliac artery during amputation at the hip. This, the original instrument, was used by the inventor on a boy aged nine subject to advanced hip joint disease and he made a good recovery.

Instruments for Operations on the Osseous System.

The origin and development of the Trepan and Trephine.

The evolution and development of the **trepan** is illustrated by a series of instruments and models shown on Screen " B."

Trepanning is one of the earliest surgical operations known, and was practised by primitive man by scraping away the bone with a piece of sharp flint or obsidian.

It is thus still performed by the Bushmen of Australia and the natives of New Britain and New Ireland. It is sometimes practised as a cure for epilepsy and nervous disorders, the hole being made to allow the escape of the evil spirits regarded as the cause of the disease.

The Incas of Peru, from an early period, employed a piece of flint with a serrated edge like a saw for trepanning.

The ancient **Greeks** employed three kinds of instruments for the operation. The **terebra,** which was chiefly used, was operated by a thong round the centre or on a cross beam, for boring. The terebra was employed when the piece of bone to be removed was larger than could be covered by the **modiolus.** The piece to be removed was surrounded by perforations made at small distances from each other, and then either the **scalper** or **lenticular** was introduced and driven through the interspaces between each perforation, and so the roundel of bone was removed.

Another type of instrument was the **prion charactos** or **terebra serrata,** a conical piece of metal with a circular serrated edge with a centre pin and a straight handle. This was operated by rapidly rolling the handle between the palms of the hands. They also used a **trepanon** or **borer** operated by a bow-drill.

Celsus (ca. 50 A.D.) describes the instruments employed by the **Romans** for trepanning. Their **modiolus** was a similar instrument to that used by the Greeks, from whom they no

doubt adopted it. They also employed the **tenebra,** of which there were two kinds ; one like the tool used by carpenters and the other having a large blade, which began with a sharp point then suddenly became broader.

In the XII century Albucasis (ca. 1152) describes a borer with a sharp point and an instrument terminating in a spear head called **" incisoria,"** both of which were employed for trepanning. In the XIV century, Lanfranc describes a **trepanon** or borer with a spear-shaped point for making a ring of perforations, and Wryghtson, an English surgeon of the XIV century, figures an instrument similar to the Roman modiolus with a **circular saw, and centre pin** fixed to a straight handle, which was operated by rolling between the palms of the hands.

Bruynswyke in the XV century describes **" treppanes "** terminating with a long gimlet-like screw, " to make small holes in the skull." Andréa della Croce, who began to teach in Venice about 1560, describes several instruments used for trepanning, operated by a **brace and drill stock,** to which the **circular saw** or **perforator** was fixed with a screw.

The first **mechanical trepan** was described by **Matthia Narvatio** of Antwerp in 1575, and in 1583, **Le Lieure** figures a **" trepane exfoliative "** in his " Officinne et Jardin de Chirurgie."

To Fabricius Aquapendente (1537-1619) is attributed the invention of the **trephine,** so-called from its triangular shape.

Savigny states : " The name **trephine** is so-called from the triangular form it acquires by the horizontal position of its handle, in contradistinction to the **trepan,** in which the head or crown is affixed to a frame or brace, similar to and used in the manner of the carpenter's wimble." To Fabricius is also attributed the invention of the trepan saw with shoulders which prevented the instrument sinking down into the membranes of the brain. Ambroise Paré (1517-1590) employed the brace or drill-stock with a binding screw to fix the saw, the drum of which was straight and smooth, with a shoulder

similar to that of Fabricius Aquapendente. He describes "**trepanes** as round saws for cutting out a circular piece of bone, with a sharpe pointed nail in the centre projecting beyond the teeth." He also figures a **trephine,** which he says "is most in use and the fittest, set forth by Dr. Crooke." This trephine has a transverse handle of metal similar to Sharpe's of two centuries later.

In the XVII century Scultetus figured a trepan operated by a drill-stock which he calls the "handle." He also describes a trephine with a transverse handle and circular conical saws. Woodall in 1639, described the trephine as "an implement of my owne composing."

In 1725, Garengeot described his **trepan perforatif** and **trepan piramide.** Sharp in 1739, introduced a trephine with a wide transverse handle of metal, the extremities of which he had roughened for use as elevators. He claimed to be the first to use a trephine with a cylindrical and not a conical crown saw. A key was used to remove the centre pin.

Heister (1743) used a conical crown saw, and states "the moderns have a method of fastening the crown on the trepan otherwise than by screwing, but this is my way." He also describes an exfoliative trepan, the handle and saw being fashioned from one piece of steel.

In 1779 Petit introduced his perforator with a steel drill-head, smooth and bevelled, for drill edges, but the head is shorter than Sharpe's. In 1782 Brambilla figured a trephine similar to Sharpe's.

Savigny's trephine (described in 1798) has a cylindrical saw with a smooth drum, and the barrel is inserted into the handle direct. It has fine teeth and no gaps, as in the trephine of Benjamin Bell. The pin runs in a slot in the barrel regulated by a binding-screw and plate. The peculiar formation of the teeth (exactly perpendicular) was claimed to be an important advantage to the operator. Savigny says: "at this time, the trepan used with a brace or wimble is now wholly laid aside in this country."

Coming to the XIX century, Benjamin Bell described his trephine in 1801. It has a wooden cross-bar, into the middle of which is screwed a steel key-barrel with a spring grip, made to grasp a slot cut in the key-end of the trephine saw. His saw has a cylindrical smooth drum with long straight teeth, arranged in three series of nine, thus three gaps are left to let out bone dust, the forerunner of the windows in modern instruments. The prismatic is controlled by a thumb or binding screw and plate, working in a slot on the side of the brass barrel. In 1817 Rudtorffer of Vienna introduced a trephine with a smooth drum, with a screw button in the shaft to raise and lower the pin.

The **bone-saw** was used from the XII century and is described in the works of Albucasis. In the XIV century it is figured by Wryghtson with a lunar-shaped blade, later, in the XVI century by Ambroise Paré, and in the XVII century by Scultetus.

Hey's saws, a development of the early XIX century, are shown in a set (**K 38** to **K 43**) that once belonged to William Hey, who was senior surgeon to the General Infirmary at Leeds in 1803. He adapted his saw from one devised by **Cockell of Pontefract.** The **Annular saw** (**K 53, K 54**) introduced by **Machell of Walsingham** in 1806, was believed by its inventor to be destined to supersede the trephine.

K 57 are **Liston's bone forceps,** and **K 56 Fergusson's** pattern, the latter awarding to the former the credit of the re-introduction of this ancient instrument, which dates back to Roman times. A set which belonged to Wormald of St. Bartholomew's Hospital (**K 58** to **K 66**) shows specimens of the short, but powerful-bladed **gouge-forceps, punch forceps,** and **nibbling forceps** which are associated with the names of **Hoffman** and **Lüer. K 72** is a **trephine for necrosis nodes, etc.,** an instrument used by Sir James Paget, Brodie and Fergusson, that was introduced by **Henry Lee,** who successfully trephined an abscess of the tibia in 1852. **K 76** is **Adam's osteotomy saw,** with which the inventor and donor

divided the neck of the femur by subcutaneous osteotomy in 1869. **K 78** is **Davy's probe-pointed saw for tarsectomy** and **K 79** is the **kite-shaped director for varus** also invented by that surgeon.

Bone spoons or **scrapers** were known in Roman times, and Diocles invented a scoop or spoon for the extraction of arrows from a wound. The **spoon-probe** is the father of the scoops used for scraping in operations on the bones. It was fashioned from the **ligula,** a toilet instrument that was used by Roman women for extracting their cosmetics from tubes and pots. The spoon-probe was used as an ear specillum for the extraction of foreign bodies from the auditory meatus, and the ear-scoop was a toilet implement used until recent times. The **rasping specillum** was employed in ancient times for curetting granular eye-lids in Greece, Rome and the near East.

In the latter part of the XIX century the spoon was re-introduced by **Volkmann,** specimens of which are in the Lister Collection (Group I ***35** to ***38**). **Lister** used very small spoons, and **Durham** introduced a **bone scraper for sinuses** as shown in **K 68.**

Section L.

Instruments for Operations on the Vascular System.

Although primitive man used a sharp thorn or flint for opening a vein, the **fleam** was probably the earliest metal instrument specially devised for "letting blood." It was employed by the Romans, and is mentioned in an Anglo-Saxon manuscript about A.D. 1000. In shape it was similar to the gum-lancet of the present day, with a double-edged tooth-shaped blade projecting at right angles to form a straight shaft.

In later times, the name became applied to an instrument employed for bleeding horses which was used with a mallet

(**L 4 a**). For human patients, it was succeeded by the straight double-edged lancet, which was generally employed by surgeons for opening a vein in the XVII and XVIII centuries.

In the XVIII and early XIX centuries small, flat silver cases for carrying from three to six lancets were made for surgeons to carry conveniently in the waistcoat pocket, specimens of which are exhibited (**L 5** to **L 7**). Pocket lancet-cases were also made of tortoiseshell, shagreen and leather (see Nos. **9, 10, 11** and **12,** page 4).

For **dry cupping,** from the XVI century, the **scarificator** (**L 47, 48, 49**), consisting of a metal box containing from 6 to 16 blades which could be released or withdrawn by means of a spring trigger, were frequently employed. **L 46 b** is a case of cupping instruments made about 1840. It contains three glass cupping vessels, a brass scarificator, spirit lamp and bottle for holding spirit. **L 47 a** is an interesting and unusual set of scarificators consisting of two silver instruments and a spirit lamp which fit into a leather case. It originally belonged to Dr. J. Atkinson, a surgeon of Brighton, and bears his initials on the case. The hall-mark shows they were made about 1785. **L 47** is a **ten-bladed silver scarificator** which originally belonged to Dr. Page Nicol Scott of Norwich in 1828. **L 49** is a **sixteen-bladed brass scarificator** which belonged to the late Lord Lister and was probably left to him by Syme. **Artificial leeches** for drawing blood were introduced about 1850 and are illustrated in **L 53.**

In the XVII century an instrument with a single blade operated by a spring, called **Schnapper,** was introduced from Germany, specimens of which are shown in **L 1** and **L 2.**

A curious instrument called the **phlebotomy bow** (**L 4**) was introduced about the XVIII century and used in Greece and Malta for venesection. This cross-bow-shaped instrument is worked like a fleam and has a straight cutting edge. It is operated by a trigger, on the withdrawal of which the stem flies forward and the fleam punctures the vessel against which

it is applied. Walfer records that a similar bow was used in America in the region of Panama.

L 7 a is a **Pewter bleeding bowl dated 1671.** The use of a vessel for receiving blood during venesection, goes back to an early period and the first representation known occurs on a Greek vase, about 500 B.C., where a large bowl with four legs is depicted standing on the floor to receive the blood from a patient being bled.

Among barbarous races, a cocoanut-shell was used for the purpose. Hand-bowls or basins appear to have been first used by barber-surgeons about the XIV century. These were sometimes of earthenware or thin brass, and in the XVII century of silver. There is record in the will of Charles Whyte a barber-surgeon, dated 1544, of "Six barbers' basins of latyn" (thin brass) and in 1606 there is an allusion to "Basons, saucers and porringers for catching blood." Drinking bowls and shaving dishes were sometimes used for the same purpose. Woodall in the 'Surgeon's Mate,' refers to "Blood porringers which are necessary at sea to be more certaine of the quantity of blood which is let. The blood porringers made for that purpose being full, hold just three ounces and somewhat more." In Italy in the XVII century, many families kept their own glass bleeding vessels which were handed down from one generation to another.

Pewter bleeding bowls came into use early in the XVII century, and were sometimes graduated to hold from sixteen to twenty ounces of blood. They were usually made with concave sides and had a flat handle attached to the rim as seen in this example.

Among the **nævus cauteries** is **Wordsworth's** (**L 12**), first described in 1858. It was the earliest pattern where the bulbous dilatation near the point allows the instrument to retain heat better than if the terminal part were narrower.

L 13 and **L 14** are **Rudtorffer's instruments for tightening ligatures,** and from **L 15** to **L 19** are other old instruments for the same purpose. **L 20** to **L 24** are specimens of the ring

instruments for tightening ligatures which were largely employed in the second quarter of the XIX century. The mounted or handled needles for conveying ligatures were in general use by the end of the XVIII century, and Brambilla figures several curved needles in 1782.

L 27 shows **Savigny's pattern** of aneurysm needle and **L 31** is **Sir Astley Cooper's aneurysm probe** described in 1809. **Sir William Lawrence** employed a similar instrument in 1815. **L 32** is **Valentine Mott's instrument for ligature of the innominate and subclavian artery,** which was presented by him to Bransby B. Cooper.. **L 38** is **Cole's pad for elastic pressure in the treatment of aneurysm,** and was described by the inventor in 1867. **L 39 a** is the same surgeon's **instrument for compressing the femoral artery** devised in 1871.

L 40 to **L 42** are **tourniquets** for making pressure on the carotid artery and other vessels, and **L 45** is **Fergusson's transfusion apparatus** which was presented to the Museum by Sir Erasmus Wilson 1891.

Section M.

Autoplastic and Orthopædic Instruments.

The case of **Adam's tenotomy knives** (**M 1**) was used by William Adams, who co-operated with Tamplin at the Royal Orthopædic Hospital. Tamplin made a great advance in tenotomy and his instruments (**M 2**) include his combined sharp and blunt-ended tenotomy knives. In 1842 he introduced division of the posterior tibial tendon in infants with talipes varus, for the first time. At his first operation he employed a small scalpel and a blunt-pointed knife. In the instrument he afterwards designed, there is a sharp-pointed knife and a blunt blade which can be made to slide along it till the point is covered. He described its use in 1846.

Section N.

Instruments for the Extraction of Bullets.

The earliest type of instrument for extracting bullets was the **screw extractor** which is figured in Ketham's ' Charethanus Wundartzney ' in 1532. This instrument, which consisted of a straight rod with a sharp gimlet-end protected by a cannula, was pushed into the wound, and when the bullet was located, was screwed into the lead and withdrawn. It went through many modifications in the XVI century, and was improved by Andrea della Croce and Ambroise Paré. **N 15** is a specimen of this type. The French clung to this form of instrument, which they called " tire fond," until the XIX century.

Bullet forceps were also frequently used from the middle of the XVI century and varied in shape. Paré figures an instrument similar to Savigny's (**N 4**), and Andrea della Croce in 1573 shows an instrument with curved blades serrated on the inside of the points of the blades. The forceps with a scoop were called the **" duck-bill "** in the XVI century, and those with serrated extremities **" crane's-bill."** **N 4** and **N 5** are two patterns of **Savigny's forceps** described in 1798.

The **Alphonsinum,** a three-bladed forceps, was invented by Alphonse Ferrius in the XVI century, and an instrument of a similar kind was revived by Ruspini in 1813. Instruments of this type were employed by army surgeons for many years afterwards, as shown in specimens **N 7, N 8, N 9.**

The injurious distending effects of some of the extractors, led to the use and adoption of a hinge similar to the one employed in midwifery forceps. By the division of the forceps into two parts, one stem could be inserted first and used as an explorer for finding the bullet, after which the second stem could be inserted and the two joined. Baron Percy employed a similar contrivance in his **" tribulcon."** **N 11** is a specimen of **Savigny's bullet forceps** with a separable hinge. **N 13** is **Coxeter's extractor** (old Government pattern) and

N 14 is Weiss's, with a lever made to push behind a bullet and raise it from its bed, after which a spring is pushed forward so as to allow of its extraction. In **Lüer's extractor** (**N 17**), two hooks are made to fit the cupped free end of the tube, which is to be rotated until it becomes embedded in the foreign body, which is then extracted by the hooks.

In connection with bullet extraction a more recent development is Sir James Mackenzie Davidson's **telephone probe** or **bullet detector** (**O 15**). This apparatus, which the inventor described in 1916, consists of a telephone, to one terminal end of which may be attached the surgeon's instrument, while a carbon plate is attached to the other terminal, which is applied to the patient's skin moistened with salt water. When any of the instruments come into contact with embedded metals, such as lead, nickel, copper, iron or its alloys used in shell manufacture, a loud click is elicited, and if a rubbing contact be made with the exploring instrument, the click becomes a sharp rattle.

Sections O. and T.

1. Miscellaneous Philosophical Apparatus applied to the Investigation of Disease.

2. Instruments used in Auscultation and Percussion.

The first record of the use of immediate percussion of the chest in diagnosis, based upon observation verified by post-mortem experiences and experiment, was made by **Auenbrugger** (1722-1809) of Vienna, in a treatise he published in the middle of the XVIII century.

Winterich of Würzburg invented the **hammer or plessor** (**O 1**) and **Hughes Bennet** devised another type (**O 2**) which was used about 1842.

O 2 a is a **pulse glass,** an appliance now quite obsolete, which was introduced about 1829. It consists of a glass

tube with a bulb at one end containing rectified spirit of wine and rarified air, which, when grasped in the hand, exhibits a momentary ebullition, that is repeated at each beat. Pulse glasses were sometimes made with a bulb at each end and held horizontally.

The Stethoscope.

Laënnec, the discoverer of the stethoscope, was born at Quimper in Brittany and was educated by an uncle, who was a professor of medicine at Nantes. After qualifying, he became an Assistant Surgeon with the French Army in the west. Returning to Paris, he joined the clinic of Corvisart at the Charité Hospital, and on meeting with Bayle he became interested in tubercle. While he remained in Paris he drew up a detailed description of 400 clinical cases.

In 1816 he was appointed Chief Physician to the Necker Hospital, and it was there he discovered mediate auscultation, which discovery gave him a place among the Immortals of Medicine. The only means of diagnosing lung diseases or diseases of the heart at that time, were the well-known percussion method invented by Auenbrugger, that of palpation, and thirdly by simply placing the ear to the chest-wall or back.

It was during the year 1816, Laënnec tells us, that he was "consulted by a young woman labouring under general symptoms of a diseased heart, and in whose case percussion and the application of the hand were of little avail, on account of the great degree of fatness. The other method just mentioned being inadmissible by the age and sex of the patient, I happened to recollect a simple and well-known fact in acoustics, and fancied, at the same time, that it might be turned to some use on the present occasion. The fact I allude to, is the augmented impression of sound when conveyed through certain solid bodies—as when we hear the scratch of a pin at one end of a beam of wood on applying our ear to the other. Immediately on this suggestion, I rolled a quire

of paper into a kind of cylinder, and applied one end of it to the region of the heart and the other to my ear, and was not a little surprised and pleased to find, that I could thereby perceive the action of the heart, in a manner much more clear and distinct, than I had ever been able to do by the immediate application of the ear.

"From this moment I imagined that the circumstance might furnish means for enabling us to ascertain the character, not only of the action of the heart, but of every species of sound produced by the motion of all the thoracic viscera, and consequently for the exploration of the respiration, the voice, the rale or rhonchus, and perhaps even the fluctuation of fluid extravasated in the pleura or pericardium."

Laënnec tried to make his paper roll into a solid body, but found he could not roll it tight enough without an aperture down the centre. This led him accidentally to discover that this aperture was an advantage. He then set out to try and find the best conducting medium, and after using glass, goldbeaters' skin inflated with air, and various kinds of wood, he discovered the lighter kinds of wood were preferable to paper, and he had his first stethoscope made of a cylinder of boxwood $1\frac{1}{2}$ in. in diameter and 13 in. long. This was perforated from end to end by a bore $\frac{3}{4}$ in. wide. It was hollowed out to a funnel-shape to the depth of $1\frac{1}{2}$ in. at one of its extremities. Laënnec thought he could hear the heart sounds better by using a stopper or plug, and the breath sounds by removing the stopper and using a conical opening as the collector of sounds.

"This instrument," he states, "I have named the **Stethoscope.**"

In June 1818, two years after his discovery, he published his treatise entitled **'De l'Auscultation Médiate, ou Traité du Diagnostic des Maladies des Poumons et du Cœur, fondé principalement sur ce nouveau moyen d'exploration.'**

It was translated into English by Dr. Theophilus Herbert and Sir John Forbes, who described it as a "Conspicuous

landmark in the history of medicine," and state "it was first received by the profession with considerable distrust, and the new method of diagnosis, especially the instrument, was attempted to be turned into ridicule."

In 1818, he submitted the results of his labours to the Académie des Sciences, which received them, it is said, with respect, but without the slightest trace of enthusiasm.

Unfortunately Laënnec broke down through overwork and had to leave Paris and return to Brittany for rest. He developed phthisis—a disease which he had done so much to elucidate—said to be from a post-mortem wound from a tuberculous subject which had been neglected. He used to cauterise the wound with butter of antimony, and maintained that if his lungs were affected it was through the wound. He died on August 13, 1826, at the early age of forty-five.

O 3 is a specimen of the original pattern once employed by a pupil of Laënnec, and **O 4,** a later type, was **used by the inventor himself.**

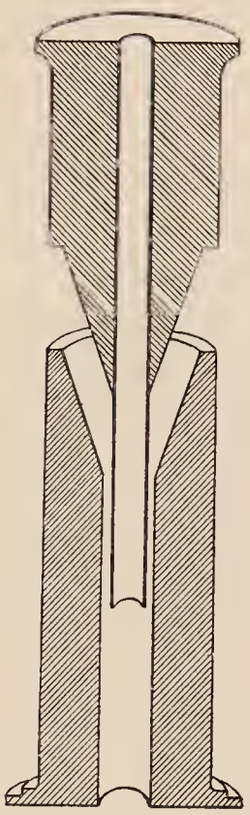
It was the third development of **Laënnec's stethoscope** which first found its way into England. It was made of wood, $7\frac{1}{2}$ in. long, with a $\frac{1}{2}$ in. bore and a bell-shaped mouth a little more than 1 in. in diameter. It was surmounted by an ivory ear-piece $2\frac{1}{4}$ in. in diameter, and was imported from Paris in 1820 by Trentall and Würtz, Booksellers in Soho Square, and sold at the price of 2 francs. When the demand for the instrument exceeded the supply from abroad, a wood-turner called Allnutt in Piccadilly began to manufacture it.

Dr. Charles Thomas Haden, the father of the late Sir Seymour Haden, is said to have been the first to introduce the stethoscope into English practice.

Charles Thomas Haden was born at Derby in 1786, and was five years younger than Laënnec. He was educated at Rugby, and in 1810 was elected one of the surgeons to the Derby Infirmary. He eventually settled in London in 1814. He had close intimacy with nearly all the great French physiologists

and pathologists of the time, and kept up an active correspondence with them. He was an early believer in the discoveries of Laënnec, and worked with him at the lathe at which he made his first instruments for auscultation.

Haden's stethoscope consisted of a wooden cylinder about $7\frac{1}{2}$ in. × 2 in. in diameter, perforated from end to end. It divided into two pieces joined by a screw, the upper end fitting into the lower by a cone ending in a metal tube which brought the two pieces firmly together.



Haden's Stethoscope..

Another type of stethoscope was introduced by **William Edward Crowfoot,** F.R.C.S., of Beccles. It was 7 in. long, slightly cupped at each end, and perforated in its length by 10 holes one-eighth of an inch in diameter.

According to Dr. Williams, when Sir Charles Scudamore went to Laënnec to try his stethoscope, he found he could hear nothing on account of the large size of the tragus of his ear. Laënnec therefore hollowed out the earpiece, which he found much improved the instrument.

The next improvement was suggested by **Piorry,** who on experimenting, found that a stem about $\frac{1}{2}$ in. thick conveyed the sound as well as the solid cylinder.

Hughes in 1828, suggested another alteration, and with the object of making the tube lighter, he hollowed out the sides, which gave it a trumpet shape (**O 5 d**). It was made still slighter afterwards, until it became a narrow tube with trumpet ends.

Williams then suggested a trumpet-shaped terminal, which gave rise to no discomfort and fitted close to the chest wall. He thought by making the other end trumpet-shaped also, but of smaller size, and introducing a movable earpiece, to

facilitate auscultation above the clavicle and scapula. He next experimented with different varieties of wood, and found mahogany and walnut less brittle than larch and cedar, but finally adopted ebonite on account of its strength ; it also had the advantage of being easily cleansed.

Some time afterwards it was found unnecessary to have a solid vibrating wall, and that one could hear as well with an india-rubber tube, where the air-column was the conductor of sound.

In 1828-29 Comins of Edinburgh is said to have introduced the first stethoscope with a flexible tube called the " Monaural," and in the following year, together with Williams, evolved the " Binaural " stethoscope.

Samuel Wilks says : " I know not who invented the stethoscope with a flexible tube, but I remember the first I ever saw was that used by Golding Bird when he saw out-patients at Guy's Hospital in 1843 (described in ' Medical Gazette,' Dec. 5, 1840). Being much crippled with rheumatism, and not wishing to rise from his chair, he found this instrument very convenient, as it also enabled him to pass the earpiece to those standing near him while he held the cap part to the patient. It was about 18 inches long with a cup-shaped piece to apply to the chest. The next step was to make two mouthpieces to apply to the chest at different spots. This form appears to have been first described by Mr. Comins of Edinburgh in the ' Lancet ' on August 29th, 1829, under the heading of a " Flexible Stethoscope." This was twelve years after Laënnec's invention. It was composed of jointed tubes made for both ears, with two trumpet ends for application to the patient."

About 1834, ivory was substituted, on account of its greater cleanliness, for both ends of the ordinary stethoscope, and some were made with an ivory screw-on cap to prevent dust entering the hollow cylinder at the narrow end.

As the instrument gradually came into greater use many other alterations were made. The stem was made shorter,

and even reduced to the length of 6 in. for portability, and the trumpet end was made to unscrew. About 1835 Fox introduced an ivory-mouthed instrument, which was followed by Davis's hollowed-out pattern. For portability, Gordon devised a jointed stethoscope (**O 5 e**) and Stokes a sliding one.

Of the different varieties, a part ebonite and rubber-tube instrument was introduced about 1870, and another, with a collapsible tube followed shortly afterwards. Aluminium was also used, but without much success.

About 1880, Lawson Tate introduced an intravaginal stethoscope to hear the beat of the fœtal heart.

Although the binaural became popular, and many improvements have been made in order to increase its sensitiveness and reliability, many practitioners still rely upon the wooden instrument of the type first devised by Hughes.

We owe to Laënnec, through the introduction of the stethoscope, a new sense in investigation of disease, and by his discovery he bequeathed an instrument which has unlocked the secrets of the heart and lungs.

O 5 a is **Sir James Mackenzie's polygraph** for recording movements due to the circulation that the Sphygmograph is unfit to register.

In 1807, Bozzini of Frankfort-on-Maine described an apparatus which threw light into almost any cavity of the body, and in 1829, Benjamin Babington invented his **glossiscope** for the examination of parts within the fauces.

In 1838 Baumés of Lyons made use of a small mirror mounted on a wooden or whalebone stem for examining the posterior nares, larynx and parts of the pharynx, and later, about 1850, Avery of Charing Cross Hospital invented an instrument for inspecting the larynx. Ten years later Czermak adopted the idea and called his instrument the **laryngoscope,** and Garcia used it to examine the human larynx on an extended scale. **O 6** and **O 7** are specimens of **Czermak's laryngoscope.**

The Clinical Thermometer and its development.

The invention of the **clinical thermometer,** which now plays such an important part in the practice of medicine, was a process of slow development. Sanctorius (1561–1636) was the first to construct and advocate the use of a thermometer in the diagnosis of disease, and so brought heat fluctuations into parallel with the fluctuations of bodily weight.

Nothing more was done until nearly a century afterwards, when Boerhaave turned his attention to the mechanical phenomena of the circulation. An important advance was made by his pupil Van Swieten, who pointed out that the heat of fever should be recorded by thermometers, as the sensibility of the physician's hand was quite untrustworthy. He recommended the employment of the mercurial thermometers made by Fahrenheit, and used them himself in the mouth and axilla.

The next step is due to De Haen, whose observations were made on a more scientific basis, for he noted the temperature of healthy men and discovered the increase of temperature in the aged. He observed the rise in temperature during rigor, the morning and evening fluctuations, and want of parallel between the temperature and the pulse, the thermometrical indications of the action of drugs and other important points.

The subject attracted several English investigators about the middle of the eighteenth century, and an advance was made by Fordyce, who was afterwards joined in his investigations by Blagden, Banks and Solander. Their experiments consisted in exposing themselves to high temperatures in heated chambers, and thus they were able to establish and prove the independence of animal heat.

A significant remark occurs in a letter written by Governor Ellis of Georgia, about this time, where in describing the great heat in the country he observes : " a thermometer hanging at the end of my nose would often stand at 105°, while in close contact with my body *I could never get it above* 98°."

John Hunter in his ' Observations on the Animal Œconomy,' published in 1786, recorded that the temperature of man is 1·5° lower during sleep, and gives a plate of a thermometer with a sliding scale which he used for experimental purposes.

Lavoisier, who with La Place worked on thermometry, in 1780, observed that animal heat generated in the lungs by respiration and was due to the combination of oxygen with hydrogen and carbon.

The next important step was made by Currie of Liverpool, who published his investigations in 1797 under the title of ' Medical Reports on the effect of Water, Cold and Warm, as a Remedy in Fever and other Diseases.' The whole of his observations were based on thermometry, and he made careful records of the temperatures in his case histories. Currie's work, though it attracted little attention at the time, is remarkable, and is now historic, as he thus undoubtedly laid the foundations of modern clinical thermometry. Sir Astley Cooper made use of a clinical thermometer with an ivory or vellum scale in 1802. A pair of instruments of this type (**O 8**) were used by John Hilton, F.R.S., but are much shorter and have fixed ivory scales.

In December 1852, Spurgin of Cambridge published a paper in the ' Lancet,' in which he describes a thermometer he had devised, by means of which, he states, " the medical practitioner can determine and record the relative degrees of heat of every part of the body, in health or disease." It consisted of an ordinary thermometer having its bulb and the lower part of its shaft suspended or fixed in a hollow cone of wood, so that the bulb descended nearly to the level of the lower rim of the cone. The portion of the shaft, which rose out of the cone, was affixed to a graduated ivory index, so the elevation of the mercury could be readily ascertained. The shape of the bulb was either spherical, oval or elongated, and was bent at a right angle with the shaft. It was placed in the centre of the hollow cone and received the heat which emanated from the point of examination. These thermometers were made for

the inventor by Biggs of St. Thomas Street, Southwark, and Weedon of Hart Street, Bloomsbury, London. Billings, who had charge of the wounded in the seven days before Richmond in the American war in 1862, is said to have used a thermometer for taking the temperature of the body in cases of fever.

In Germany, Zimmerman, and in England, John Davy, published their physiological researches in 1863, which made a further advance, and in 1868 Wunderlich summed up the results of twenty years' researches in his historic work dealing with the subject.

About 1865, Aitken introduced his clinical thermometers, which were first used as a novelty in the wards of English hospitals in 1866-67. They were formidable instruments about ten inches long, and took five minutes to register the axillary temperature. They were carried under the arm "like a gun," and were first made by Casella of London under the direction of Dr. Aitken, and were sold in pairs, one bent and the other straight, fitted into a mahogany case, with directions for use (**O 9**). In 1868, Arnold and Waters added a great deal to the then existing knowledge of the subject, especially in connection with the temperatures of typhus and typhoid fevers, and numerous experiments were carried out and carefully recorded by Breschet, Becquerel, Bouilland and Andral in 1869.

Sir Clifford Allbutt was the first to originate the present short instrument in 1867, and his suggestions were carried out by Reynolds and Branson of Leeds. Sir Clifford says: "When I first designed pocket thermometers, I made them to fit within stethoscopes, but I did not like the result. The length of six inches in the stem is useful and is within the length of a stethoscope, but I found that a three inch may be as accurate as a six inch, and I had one made for my own use. At this time six minutes were considered necessary to record an accurate temperature." Allbutt's instrument had a chamber anterior to the bulb, and from six inches he first

reduced the length to four, and finally to three inches. In the first type, the index was not separated but the anterior chamber was throttled at its side, so that the whole column was supported, until by a sharp downward swing the column was jerked backward to the anterior chamber, and so out of sight. The next development was the introduction of the air-speck index, by means of which the column of mercury was more easily shaken down, and so by improved workmanship the period necessary for registering the temperature had gradually been reduced from six minutes to thirty seconds.

The collection (**O 9 a 3**) shows the development from the first short instrument suggested by Allbutt in 1867 to the latest type.

From time to time various suggestions have been made with regard to the shape of clinical thermometers, and instruments have been made in the form of a coil, and bent like the letter U, but none of these have proved better or more reliable than the familiar short and reliable instrument at present employed.

O 9 a 2 is a **stethometer** devised by Quain which was improved by Coxeter, capable of showing the movements of both sides of the thorax at once. **O 9 b** and **O 9 c** are **Ransome's Goniometers** for measuring the ribs, and his **thoracic callipers** for demonstrating the diameter of the rib circuit during forced respiration.

The collection of **microscopes** exhibited are interesting on account of their association with distinguished scientific men. **O 10,** made by Ross about 1860, belonged to Sir James Paget, Bart. **O 11** was the working microscope of Professor Quekett, who was Conservator to the Museum of the College from 1852 to 1861, and **O 12** is a microscope made by him about 1850. **O 13** is the microscope employed by Sir Ronald Ross by the aid of which he first detected the malarial parasite in the mosquito. **O 13 a** is a set of Lieberkuhn's microscopes which were used about the middle of the XVIII century, and **O 14**

is Sorby's **microspectroscope** for facilitating the spectroscopic examination of coloured substances such as are used for microscopic slides.

At the latter end of the XVIII century an appliance known as **Perkin's Metallic Tractors** was introduced to this country from America. The inventor claimed that by their influences on the human body, various inflammatory diseases such as rheumatism, pleurisy and gout could be cured. They were said to be composed of zinc and copper. They had a large sale at five guineas a pair, until Dr. Haygarth with Dr. Falconer of Bath proved that they were valueless by obtaining similar results by using two pieces of plain wood. **O 16** and **O 17** are a pair of the original tractors that were employed by a physician at Bath. The vendor of this quack appliance is said to have returned to his native country, after the fraud was exposed, the richer by 50,000 dollars.

Section P.

Splints, Trusses, Surgical Tables, Beds, Mattresses, Chairs, Cradles, Rests, etc.

P 1 are two pairs of **"lined," "split" or "kettle-holder splints"** introduced by Benjamin Gooch in 1758. **P 3** and **P 4** are **splints for Colles's fracture of the radius** introduced by Professor A. Gordon of Belfast before 1875. **P 6** is **Busk's long splint for fracture of thigh. McIntyre's modified splint P 9** is followed by **Pott's original simple leg splint P 13,** and **P 16** and **P 17** are **fracture-beds and cradle** devised by Winchester about 1860. **P 20** is **Salter's fracture cradle** introduced about 1850, and **P 24 Benjamin Barrow's apparatus** for injuries and diseases of joints described in 1847. **P 26** is a **chair for reduction of dislocation of shoulder-joint** devised by Mr. Robertson of Kelso, Scotland, adapted from the **"Ambi"** of Hippocrates, and **P 32** to **P 37** are samples of **trusses** used about 1870. **P 39** is a **candle holder with reflector** that

Roman artificial leg.
ca. A.D. 300.
(front and back views.)

was used by Sir T. Spencer Wells for operations at night, and **P 40** are specimens of **lidded pewter spoons** used in the early XIX century for administering castor oil or other nauseous medicines. **P 44** is **Ellis's pessary introducer** described in 1841 for facilitating the introduction of a pessary into the rectum.

Section Q.

The **Dissection and Post-Mortem Instruments** include **Charrière's post-mortem hammer and chisel** (**Q 3**) used in the mid-nineteenth century, and **Q 1** is a case of **dissecting instruments** made about 1860 that was used in the Medical School of St. Bartholomew's Hospital.

Section R.

Appliances for the Replacement of Lost Parts.

R 1 is a **Roman artificial leg** made of bronze plates fashioned to a wooden core, and is a unique relic of orthopædics of the early Christian era. It was excavated from an undisturbed tomb near Capua, together with a skeleton and three black and red pottery vases. It is probable, that this artificial limb was intended to replace the right leg as the skeleton had a waistband of sheet bronze edged with small rivets made to fasten a leather lining. Two iron bars, having holes at the free ends, are attached to the extremity of the bronze, and a quadrilateral piece of iron, found near the position of the foot, was probably fixed to the leg below so as to strengthen it.

R 5 is a **model trunk, bearing four artificial limbs,** designed by Mr. H. Heather Bigg, which were worn by a woman for fifteen years. **R 6** is an **artificial nose mounted on a spectacle frame** from the collection of James Merryweather. **R 7** is a **crutch** devised by C. J. S. Thompson in 1916 for assisting men suffering from injuries to the thigh, leg or foot in walking without strain, which was extensively used in military hospitals during the war.

Section S.

Apparatus for the administration of Anæsthetics.

S 1 is a metal mouth-piece made about 1860, and **S 7** is the first nasal inhaler for continuous administration of nitrous-oxide that was devised by Coleman in 1898.

Section T.

Instruments used in antiquity by the Romans and native surgical Instruments.

Surgical instruments employed by the Romans, facsimile models of which are exhibited in case **T 75**, are especially interesting as being the earliest original specimens extant. The originals were excavated at Herculaneum and Pompeii, mostly in the "house of the physician," and are now in the National Museum at Naples. Other collections are to be seen at the Museum of St. Germain-en-Laye near Paris, at Le Puy-en-Velay and in other Museums in France, Italy and England. Although the Greeks knew the process of tempering steel, their ancient instruments have perished, and we have only representations of a few on marble tablets.

The Roman surgical knife had usually a blade of steel and a handle of bronze.

Several of these instruments, notably the **forceps (T 75.32), elevator (T 75.36), male catheter (T 75.37)** and the **rectal dilator (T 75.42)** are similar to those employed to-day. **T 75.1** and **2** are **portable medicine cases** probably carried by the physicians of ancient Rome.

T 1 to **T 51** consist of a collection of surgical **instruments made and used in Japan,** but are probably copied from European types. **T 51 a** to **T 51 l** are a set of **instruments in use in Japan** before the introduction of the European types. **T 54** and **T 54 B** and **C**, are sets of **Chinese surgical instruments,** the first eighteen being designed for ophthalmic operations.

T 51 a to **T 51 h** are **Japanese obstetrical instruments** used in the early nineteenth century. In 1812, Mitzu Sada Kangawa, the Court Accoucheur at the time, devised several instruments that he is said to have used with success at the births of several members of the Imperial family. The following are examples : **T 51 f** is a **whale-bone fillet, T 51 b** and **e** is a later **fillet** introduced in 1832, with a silk net to catch the head of the fœtus, **T 51 d** is a type invented by Kangawa in 1869, and **T 51 h** a **blunt hook** with a wooden handle. **T 52** is a **Baluchi circumcision knife** and **T 52 a, 1** and **2, wooden instruments used for circumcision by the Arabs. T 57** to **T 59** are **lithotomy instruments** used in the North-west provinces of Bengal, and **T 60** to **T 65** a set of **ophthalmic instruments** used in North-west Bengal. In India, operation for cataract has been performed by native practitioners from early times.

T 65 b is a set of **instruments for couching** used in Southern India. **T 66** and **T 67** are specimens of **Chinese trusses,** and **T 68** is a **cane shield** used by the Dyaks of Borneo for protecting boils and other tender morbid structures.

T 70 is a **bow and arrow** tipped with a splinter of glass used by the natives of Bulda, Rigo District, British New Guinea, for puncturing the skin to relieve pain. The South Sea Islanders used a similar primitive appliance tipped with flint for opening abscesses. Another native instrument is a **Shark's tooth,** mounted, which was used for opening abscesses by natives of Ellice Islands (**T 71**).

T 71 a to **T 71 b** is a collection of **native surgical instruments** used by the **Fijian Islanders.** They consist of bougies, trocar cannula and splints. **T 72** to **T 72.16** are instruments employed by native oculists in Hindustan.

T 73 is an interesting set of **ophthalmic instruments,** made of **bronze and damascened with gold and silver,** that were obtained in Crete. Several appear to have been modelled or copied from early Roman instruments.

Gourds, sometimes carved and ornamented, are commonly employed for administering enemas in some parts of Africa.

T 74 is one that has been employed for the pnrpose, and **T 74 a** is a specimen used by the Bushongo people in the Belgian Congo.

T 76.1 to **T 76.35** is a collection of native surgical instruments used by the Shawiya in the Aures District, Algeria, at the present time. They consist of instruments employed in trepanning, bone saws, cauteries, seton needles, bullet probes, splints, etc., all of which are of native workmanship.

Section U.

Medico-Legal Collection.

The objects in this section are exhibited in Case **Q 1,** and are described in detail in the MS. catalogue. They include the following specimens of interest: **U 3** and **U 4**, the bladder, vagina and uterus of Harriet Lane, who was murdered in 1875 by the Wainwrights; **U 5,** fracture of the axis from a case of judicial hanging in Alipore Gaol on September 25th, 1924; **U 6** to **U 10,** pieces of string and cord used for hanging in several cases of suicide. **U 13** is the upper extremity and part of the shaft of a right femur removed from the charred remains of a body, believed to be that of an anarchist known as "Josef," who, with another man unknown, was burnt to death after the Sidney Street siege and fire at 100 Sidney Street, London, E., on Jan. 5th, 1911. **U 16** is a photograph of the charred remains of "Josef." A notch, supposed to be due to a bullet, is seen in the anterior margin of the occipital bone. A full description of the remains will be found in the catalogue of the Medico-Legal Collection, p. 7. **U 17** is an umbrella carried by Albert Betts, and skirt, shoes, blouse and gloves worn by Marion Grist, who were killed by lightning on Wandsworth Common, London.

William Hunter's "loop."
John Hunter's lithotomy knife.
John Hunter's flexible catheter.

HUNTERIAN RELICS.

The instruments and other objects associated with John Hunter are exhibited in a case at the north end of Room 1 in the Museum.

They consist of : (1) **A pair of scissors** for a surgeon's pocket-case ; (2) **Spatula** for spreading ointments. The holes pierced through the handle were for a piece of knotted string by means of which the spatula might be suspended in boiling water in order to clean it ; (3) **Dressing forceps** with steel spring between the handles—a type generally used in the latter part of the XVIII century ; (4) **Two surgical needles** in a shark's skin case, used for passing ligatures ; (5) **John Hunter's lithotomy scalpel.** Hunter used this knife, which he designed for lateral lithotomy, and Savigny figures it in 1798, and describes it " as the scalpel for this operation invented and used by the ate Mr. John Hunter." Seerig calls it **" Hunter's Lithotome "** ; (6) **Dr. William Hunter's uterine polypus loop** employed by John Hunter for passing ligatures in the treatment of aneurysm; (7) **A flexible silver catheter** that belonged to John Hunter and was afterwards in the possession of Sir Charles Bell ; (8) **A tortoiseshell case fitted with six lancets.** This is a type of the little pocket lancet cases usually carried by physicians and surgeons in the XVIII century. The name " J. Hunter " is engraved on the silver plate on the lid ; (9) **A pair of apothecaries scales and box,** made by Henry Neale, London ; (10) **A knife for cutting quill pens,** said to have belonged to John Hunter ; (11) **A lancet** ascribed to John Hunter ; (12) **A urethral caustic introducer** originated by John Hunter. Hunter used this instrument for introducing caustic into the urethra for the destruction of strictures. It is figured by Savigny in 1798.

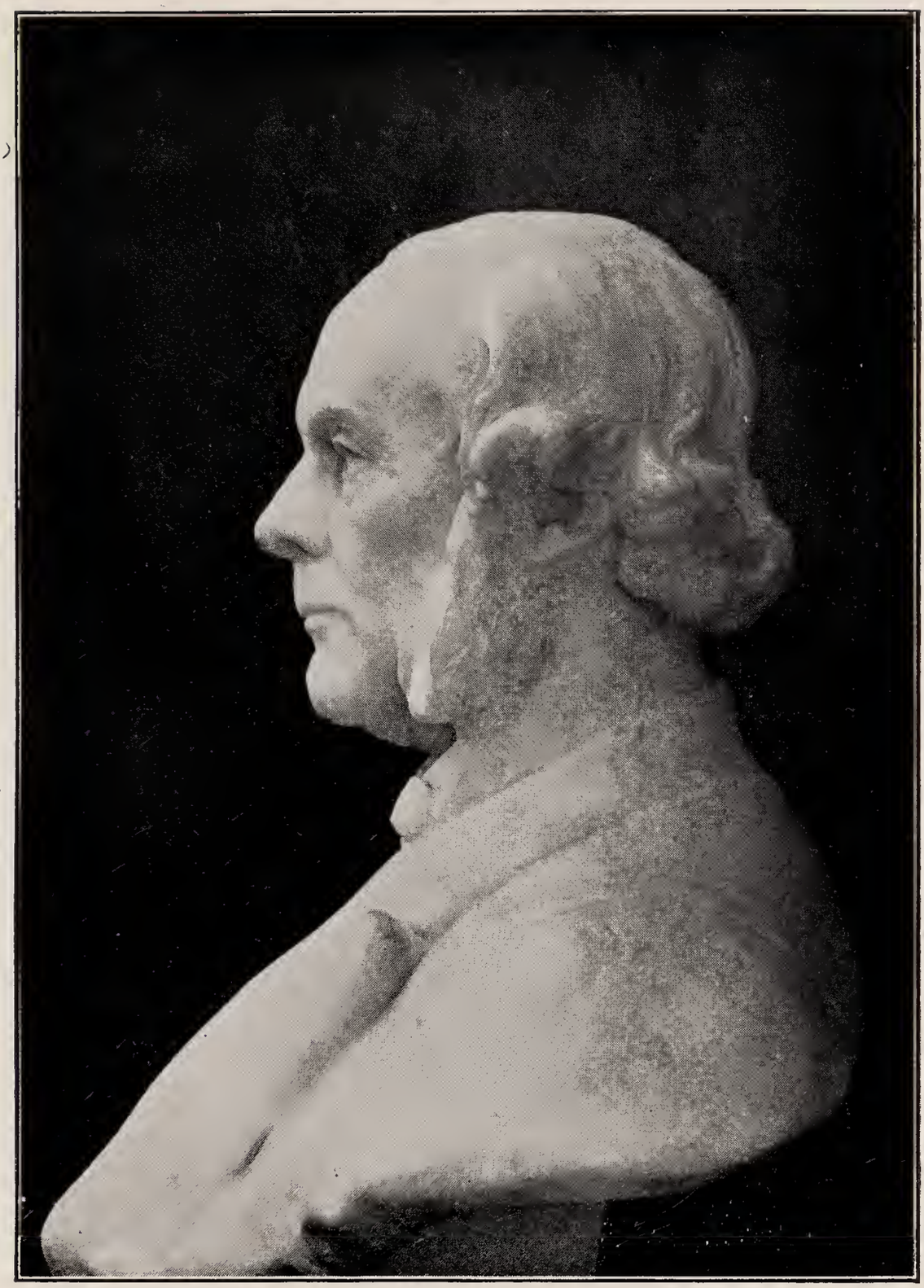
THE LISTER COLLECTION.

The extensive collection of instruments formerly the property of the late Lord Lister came into the possession of the College from his nephew Sir Rickman J. Godlee, Bart., in 1912. It is divided into three groups : (1) Instruments devised, modified or freely used by Lister ; (2) Instruments used by James Syme, the great Scottish surgeon, who was Lister's father-in-law ; (3) A collection of instruments chiefly presented to Lister which were in his possession but not used by him.

The instruments in Group I are exhibited in a special case in the north end of Room 1. Many of these were originated and designed by Lister himself.

In his earlier years Lister devoted much study and attention to the perfecting of an **abdominal tourniquet,** as until about 1860, no thoroughly efficient instrument of the kind was known. The first type he designed (*1) consisted of a semi-circular flat bar of steel, its distal ends being apart, so as to enable it to be passed round the patient's loins. The upper extremity terminates in a ball with a hole in it and a screw passing through, which is a cylindrical steel rod. At the upper extremity of the rod is a flat oval thumb-piece, and at the lower a steel disk, affixed to which is a convex pad covered with chamios leather for pressing on the aorta. The lower end of the bar has a brass tube which revolves round it. A hinged brass plate is affixed to this tube and is attached by screws to an oval steel plate bearing a pad made for counter pressure on the loins, which can move freely on its long or short axis.

"I have found it advantageous," he writes, "to interpose a small round sponge between the anterior pad and the abdomen, as it accommodates itself well to the parts to be compressed. While the pad is being screwed down, an assistant with his finger on the femoral artery at the groin marks the time when the pulsation ceases."



Lord Lister, O.M.
Born 1827. Died 1912.
From the bust by
Sir Thomas Brock, R.A.,
in the
Royal College of Surgeons of England.

In practice, however, he seems to have found the body-bar too short, and also that his ball-and-socket joint was placed on the wrong pad, for, in the second pattern (* **2**) we find that the lumbar pad is firmly fixed on a fenestrated base, and the free movement of the ball-and-socket joint is transferred to the aortic pad, while the body-bar is also made larger. But he was not satisfied with this improvement and designed a third model (* **3**) in which the lumbar pad is placed transversely to the bar, which he found a great advantage.

Later on, with characteristic thoroughness, he made a still further improvement shown in the fourth model (* **4**) which may be regarded as the finished and perfected instrument. This specimen is furnished with a firm, large transverse lumbar pad and aorta pad, with a limited motion, which made it stronger.

Probably no instrument bearing Lister's name is better known than his **sinus forceps** (* **9**) which he introduced in 1875. He first described the forceps in a paper on " Recent Improvements in the details of Antiseptic Surgery," published in 1875, in which he states : " The narrow drainage tube may be readily inserted by means of a simple modification of the dressing forceps, introduced by myself several years ago, but hitherto unpublished. The blades, which are straight, are ground down to the size of a probe at their extremities, so that they can be passed into a very small orifice. This instrument, which goes by the name of sinus forceps, will be found very useful for extracting small exfoliations and for various other purposes."

The total length of Lister's own pair is 6 inches, the blades being 2 inches long, very slender, with blunt points. They have fine transverse grooves on their opposing inner surfaces, and ring-handles like scissors. When the handles are closed the shanks do not touch, only the grooved extremities of the blades come in contact. Lister used to demonstrate that a properly constructed pair of these forceps would pick fluff out of the barrel of the smallest key on his ring.

He next turned his attention to **urethral forceps** (* **16**) for extracting calculi from the prostate. The first type he devised were 11 inches long, the blades forming a thin oval ring by their fenestræ, $\frac{5}{8}$ of an inch long, by $\frac{1}{4}$ inch in transverse diameter. The fenestration of the blades is the chief feature.

Sir Rickman Godlee states : " This is the first pair of urethral forceps of this shape that Lister devised, and he was much pleased with them."

He later improved them by eliminating the fenestration (* **15**), and in the final type the shanks are rather slender, the blades only $\frac{3}{4}$ inch long and $\frac{1}{4}$ inch wide, and the inner surfaces concave and smooth. The shanks between the blades and the lock, where they make the curve, are slender and rounded, while above the lock they gradually become stouter and flatter up to their blocks. They have a simple screw or scissor-lock. There is a block on each shank within an inch of the ring handle, but none near the lock. The shanks, about $\frac{1}{4}$ inch apart, where they spring from the rings, lie almost together at the blocks when the handles are firmly closed. " This arrangement was designed by Lister himself," says Godlee, " and he was justly proud of it. This was no mere surgical toy."

Lister was always an admirer of the ingenuity and skill of the surgeons of America, and when Bigelow visited London and gave demonstrations at the house of the Royal Medical and Chirurgical Society, he was struck by the lithotrite he used, and had one made exactly like it. This instrument he frequently used, and it was afterwards employed by Cheyne and Godlee. Lister's **lithotrite** weighs $13\frac{3}{4}$ oz. and is 17 inches long. The handle and cap measure 4 inches, the metal handle is $1\frac{1}{4}$ inch in diameter, and the length of blade is $2\frac{1}{8}$ inches. Calibre, English scale No. 20 (* **17**).

Shortly before he retired from practice, Lister tried a new method of dealing with fractures of the patella of long standing. He states : " In drawing down the upper fragment I found a great advantage from the use of a very strong, sharp hook,

the point of which was inserted in the tendon of the quadriceps at its attachment. By this means I was able to exert much greater traction upon the bone than can be done by simply pulling on the wire."

In the **sharp hook** (* **21**) he devised, the handle, shank and hook are continuous and are $9\frac{1}{2}$ inches long. The hook is bent slightly backwards on the stem; it is stout, and makes a wide curve, the point being very sharp and not bent inwards. The handle is feathered so as to be widest at its free end.

He employed **steel or bone pegs** (* **23** and **25**) for ununited or badly united fractures. The steel pegs are four-sided, and a set of seven shown, consist of three $7\frac{1}{2}$ inches long, three $5\frac{1}{2}$ inches and one $2\frac{1}{2}$ inches in length. They are very stout, the points being blunt, and the heads form a transverse projection of about $\frac{3}{8}$ inch in breadth. When using, a round hole of suitable size was bored and the square peg was driven into it.

He found it easier of introduction than a round peg, which would be a little larger than the drill. It held the opposite fragments firmly together, and the spaces on every side of the peg allowed the blood and serum to escape from the bone. The head of the peg was allowed to project from the dressings and it was removed when union seemed satisfactory.

Lister considered that the blunt end of a hernia knife was too long, so he designed a **bistoury** (* **11**), which he employed for hernia and fistula, the total length of which was seven inches. The metal is hollowed, so that the back is relatively broader for about $1\frac{1}{2}$ inches from the extremity, which is blunt and very narrow.

In the collection is a case of **eleven scalpels** (***51**) which he employed for general purposes in operative surgery about 1865. The handles are of ebony, with convex sides. The free ends are flattened and widened, and are about $5\frac{1}{2}$ inches long. The blades are narrow and the edges are never highly concave, while the backs are broad at the handles, turning slightly downwards, especially at the points.

When amputating, Lister generally employed **Robert Liston's amputation knives** (* **31**), which are well-known to have long, slender blades, slightly bowed and narrowed near the point. The largest blade of his set measures $9\frac{3}{4}$ inches, and the breadth near the handle $\frac{3}{4}$ inch. The smallest blade is $6\frac{1}{2}$ inches long and $\frac{1}{2}$ inch in breadth near the handle.

Like Sir Benjamin Brodie he had a preference for rigid metallic instruments in place of flexible bougies, and hence devised his **dilating sounds** (* **14**), which he preferred to a catheter for gradual dilation of strictures. They are rounded at the point and the stem, and slightly constricted beneath it.

The **cleft palate needles** (* **12**) designed by Lister are somewhat like Smith's, but with a smaller cutting part. They are 5 inches long, curved and bent laterally at right angles to the stem, which is about 1 inch, and are mounted on ebony handles.

No account of the instruments associated with Lister would be in any way complete without mentioning his **apparatus for spraying antiseptic solutions** (* **42**). The **first primitive type, or donkey-engine,** was employed by him in the operating theatre of the Edinburgh Royal Infirmary, before the steam apparatus came into use. He exhibited and described it at the meeting of the British Medical Association in Plymouth in 1871 (* **43**).

It consists of a stout, wood tripod stand, the legs of which are about 3 feet long. On the top of it is a tray holding a glass vessel for the solution, and alongside of it a brass pump, worked with a long handle, to produce the spray, which was conveyed by a pipe and rubber tube.

This simple but cumbersome appliance was followed by the improved portable **antiseptic steam spray,** by means of which the spray was projected by steam pressure. Of this apparatus he had several types made, each of which embodied improvements, as well as being smaller and more handy. * **40** and * **41** are specimens of **Lister's apparatus for the investigation of sterilised fluids and of fermentation.** The former is a flask he devised for preserving sterilised solutions, noteworthy for

Case containing the instruments, relics, and manuscripts of
Lord Lister, O.M.,
in the
Royal College of Surgeons of England

the syphon arrangement by which he replaced the funnel. The latter shows **six** very short **test tubes,** each capped by the closed end of a larger tube. With due precaution fresh milk was transferred to these tubes, which were placed in a room adjacent to the dairy. Many fungi developed, but the bacterium lactis was absent, yet it was found that even when boiled milk was touched with a needle dipped in souring milk from a dairy, the bacteria lactis developed freely. ***40** is an original specimen of the flask he devised and used, still known as **Lister's flask.** ***48 and *50** are specimens of **carbolised and tannic catgut** prepared by Lister himself. ***54** and ***55** are **stethoscopes** used by Lister when in practice, and ***58** is the large **binocular microscope** with objectives made by R. & J. Beck, which he employed in his work.

Group II.

Consists of over two hundred surgical instruments of various kinds used by Lister in the course of his practice or bequeathed to him by Professor James Syme. Some of the latter bear his name such as (****3**) **Syme's abscess knife,** (****96** to ****102**) **Syme's lithotomy forceps,** (****126** and ****127**) **Syme's own staffs for external urethrotomy,** (****128**) **Syme's perineal catheter,** and (****133**) **Syme's probe-pointed catheter.**

In his early days Lister employed **Butcher's saw** (****183**) and practised **acupuncture ;** (****208**) is a **needle** used by him for that purpose.

GROUP III.

Consists of a collection of over forty instruments that belonged to Lister, many of which were obsolete before he began to study medicine. The **central-grooved lithotomy staff** (*****16**) dates from the XVII century and the **gorgets** *****15**` were made about the end of the XVIII century.

II.

THE HISTORICAL ROOM.

In this room are exhibited historical relics and curious objects connected with surgery, medicine and medical folklore.

In **Case I,** on the left, are casts and objects illustrating **abnormal development.**

On **Shelf A** are **casts of the hands of some pugilists** celebrated in the past, such as **Tom Sayers, John Jackson,** and **Ben Caunt** who was champion of England in 1840.

Shelf B. Specimens of **shoes worn by people of gigantic stature** such as **Patrick Cotter O'Brien,** known as the **"Irish Giant,"** who is said to have been 8 ft. 7 in. in height. Casts of his right hand are shown on **Shelf C,** also **casts of the hands of William Bradley,** on **Shelf D,** the English giant born in 1798, who was 7 ft. 8 in. in height.

On **Shelf E** is an early copy, in marble, of the **"Hermaphrodite"** from the original Roman sculptured figure in the Louvre in Paris.

In **Case II, Shelf A,** is the model of a **head of a microcephalic idiot** and a **human body dissected and dried,** to show the spinal, cerebral and sympathetic nerves in "one comprehensive view." A cast prepared by Professor D. J. Cunningham to demonstrate the **cranio-cerebral topographical relations,** and on **Shelf B, casts of the head and right foot of the extinct Dodo.**

In **Case III, Shelf A,** there is an **abnormal penis** of a foreign sailor with artificial incisions made through the skin, and a cast of the **genital organs of a Chinese eunuch.** On **Shelves B, C and D** are shown a number of specimens of **human skin elaborately tatooed,** and on **Shelf E, souvenirs** from the **Temple of Asklepios at Epidaurus and from the fountain of Hippocrates at Cos.**

Case IV, contains on **Shelf A** a **heavy chain and belt** found with a similar one, in a dark attic in one of the oldest houses in Church Street, Stoke Newington, probably used in the

JOHN HUNTER.
Born 1728. Died 1793.
From the statue by
H. Weekes, R.A.,
in the
Royal College of Surgeons of England.

XVIII century to secure an insane person. **Shelf B,** an **electric machine** used in daily practice by John Birch, surgeon of the Second Troop of Horse, Grenadier Guards, in 1788, also **two chastity girdles.** The specimen on the right, originally belonged to the Duke of York, son of George III, who on presenting it to Lord Fitzroy Somerset accompanied it with a note written on 8th Feb., 1821, expressing the wish that his " Lordship may find it useful."

The origin of these girdles appears to have arisen from the ancient custom of infibulation still carried out by primitive tribes in Africa. Its practice among the early civilisations of Egypt and Rome goes back to a period of antiquity.

Italy is generally credited with the invention of the padlocked girdle and it is first mentioned in connection with Francesco II da Carrara the last sovereign lord of Padua, in the XIV century, who is said to have had apparatus of this kind made for his wives and mistresses. One is described by Nicholas Chorier as " a grating of gold, held stationary and secured by four small chains to a girdle which was lined with velvet, and fastened about the hips by means of a lock." They were introduced in other forms into Germany about the sixteenth century and were probably used in France from the sixteenth to the middle of the eighteenth century.

As late as 1750 the chastity girdle was mentioned in a case that is said to have been tried at Nimes, in which it was declared that the defendant had insisted on his mistress wearing a chain and padlock or girdle of chastity, whenever he went on a journey.

Shelf C. Two portions of small intestine with growths projecting above the mucous membrane, probably parts of the intestine of Napoleon Buonaparte. These specimens are said to have been given by Dr. Barry O'Meara, Napoleon's physician, to Sir Astley Cooper, and came from his museum with the following description : " Incipient fungus in the glands of an intestine. Napoleon. Barry O'Meara to Sir Astley Cooper."

Sir Arthur Keith, the Conservator of the Museum, carefully studied the whole question of the authenticity of these remains and came to the conclusion that they were almost certainly from Napoleon.* He states that the two specimens (**136**) show a diseased enlargement of the lymphoid tissue of the bowel and are not cancerous growths. Fig. I shows the larger piece of bowel with the plaque-like outgrowth on the surface of the mucous coat. Fig. II is the same specimen viewed on its peritoneal or outer surface. The plaque-like growth is also apparent on this surface. The serous coat over it is frayed and ragged. Fig. III shows the second piece of bowel with a similar but smaller outgrowth in the mucous coat.

On the same shelf are **two hands believed to be those of Thomas Beaufort, third son of John of Gaunt,** Duke of Lancester, who died in 1427. The strange story of how they were discovered and came to be preserved in the Museum, is one of more than ordinary interest.

Thomas Beaufort was the third son of John of Gaunt by his third wife, Lady Catherine Swynford. He won fame as a soldier and also held distinguished offices under the Crown during the XV century. He was half-brother to Henry IV, and was created Earl of Dorset, Duke of Exeter and Knight of the Garter. In 1407 he was made captain of Calais, and shortly after was appointed admiral of the northern and western seas for life. On the accession of Henry V he was made lieutenant of Aquitaine.

In 1415 he accompanied Henry V on the invasion of France, commanded the rearguard at the battle of Agincourt, and took part in other important engagements. He captured Evreux, showing great courage and bravery, was prominent at the siege of Rouen, and was eventually made captain of that city. After a long campaign in the coast towns of Normandy, he returned to England upon the death of Henry V

* *See* British Medical Journal, 1913, Vol. I. p. 53. "The History and Nature of certain specimens alleged to have been obtained at the Post-mortem examination of Napoleon the Great," by Professor Arthur Keith.

Fig. I.

Fig. II.

Fig. III.

Portions of small intestine with growths projecting above the mucous membrane. Probably parts of the intestine of Napoleon Buonaparte.

in 1422, and jointly with his brother Henry, Cardinal Bishop of Winchester, was appointed by Parliament to take charge of the royal infant Henry VI.

Thomas Beaufort died at his Manor at Greenwich at the age of 52, on January 1st, 1427, and by his will (given in Dugdale) he directed that he should be buried in the Abbey of St. Edmund's Bury, near his wife, who had predeceased him, at the entrance to the Chapel of Our Lady, close to the wall. Here, according to the record, his body was found 350 years later, " as perfect and entire as at the time of his death."

The next part of the story, which tells of the discovery of the body, is related in a communication made to the Royal Society by Dr. Charles Collignon, professor of anatomy at Cambridge, on June 25th, 1772. It is entitled " Some account of a body lately found in uncommon Preservation under the Ruins of the Abbey at St. Edmund's Bury, Suffolk, with some reflections on the subject." The professor states that : " In the month of February last, some workmen, digging among the ruins of this Abbey, discovered a leaden coffin supposed from some circumstances to contain the remains of Thomas Beaufort, Duke of Exeter.

" As it certainly was buried before the dissolution of the Abbey, it must have been there two or three hundred years. It was found near the wall on the left-hand side of the Choir of the Chapel of the Blessed Virgin, not enclosed in a vault, but covered over with common earth. Mr. Thomas Cullum, a surgeon, says the body was enclosed in a leaden coffin surrounding it very close, so that you might easily distinguish the head and feet. It was wrapped round with two or three large layers of cere-cloth, so exactly applied to the parts, that the piece which covered the face retained the exact impression of the eyes and nose."

After giving an account of the internal organs as he found them, the professor observes that :

" The hands retain the nails, and the cere-cloth, which was of considerable weight, was doubtless put on hot. Might

not the cere-cloth, impregnated perhaps with gums or resins, thus excluding air, have accounted for the preservation of the body ? "

Cere-cloth, in which the bodies of the dead were often wrapped before burial during the Middle Ages, was a coarsely woven material prepared by dipping it into melted wax that had been impregnated with myrrh, cinnamon, and other preservative spices. Fabyan, in 1494, alludes to " Ye corps to be seryd and anoynted with ryche and precyose bawmys," and Murray gives the following quotation from a work printed in 1557 : " Ceere them (the bodies) in three score folde of ceered cloths."

It was not until the middle of the last century that further light was thrown on the subject, by the discovery of a manuscript purporting to have been written by one Joseph Pater, of Bury St. Edmunds, at the time when the remains were found. According to this document :

" On the 20th February, 1772, some labourers employed in breaking up part of the old abbey church, discovered a leaden coffin which contained an embalmed body as perfect as at the time of its death ; the features and lineaments of the face were perfect, and were covered with a mask of embalming materials. The very colour of the eyes distinguishable ; the hairs of the head, brown, intermixed with some grey ones ; the nails fast upon the fingers and toes as when living ; stature of the body about six feet tall and genteelly formed.

" The labourers, for the sake of the lead (which they sold to Mr. Faye, plummer in this town, for about 15s.), stript the body of its coffin and threw it promiscuously amongst the rubbish. From the place of its interment, it was soon found to be the remains of Thomas Beaufort, third son of John of Gaunt, Duke of Lancaster.

" He was a great benefactor to this church, died at East Greenwich in 1427, in the 5th year of King Henry ye Sixth, and was interred in this Abbey near his duchess as he had

The hands of Thomas Beaufort,
third son of John of Gaunt.
Died 1427.

by his will directed. On the 24th February following, the mangled remains were enclosed in an oak coffin and buried about eight feet deep, close to the north side of the north-east pillar which formerly assisted to support the Abbey belfry."

The writer concludes by stating :

" Before its re-interment the body was mangled and cut . . . by Thomas Gery Cullum, a young surgeon in this town. The skull he sawed in pieces . . . his arms chopped off below the elbows and taken away. The crucifix, supposed to be a very valuable one, is missing. It is believed the body of the Duchess was found (within about a foot of the Duke's) on the 24th February.

" Every sensible and humane mind reflects with horror at the shocking and wanton inhumanity with which the princely remains of the grandson of the victorious King Edward the Third have been treated and 345 years after his death.

" One of the arms the said Cullum confesses to have in spirits."

This account corresponds to some extent to that given by Professor Collignon, who had evidently been informed of the circumstances by Mr. Cullum.

Thomas Ghery Cullum, the surgeon mentioned in the manuscript and also by the professor, was the younger son of a Suffolk baronet of that name, and on the death of his brother succeeded to the title and relinquished medical practice. Apparently he kept one of the hands he had sawn off and for a time the other disappeared, but, according to Jeaffreson, it came into the possession of a showman, who exhibited it about the country at the fairs he visited. It eventually became the property of John Hunter, who may have bought it from the showman, for it found a place in his great anatomical collection, and was among the specimens in his museum when the former was purchased by the Government after Hunter's death in 1793. The other hand, which had been retained by Sir Thomas Ghery Cullum, was presented by him to the Royal College of Surgeons in 1814. In this curious

way the hands of Thomas Beaufort, after being separated for forty-two years, came together again.

The hands, even now, after a period of five hundred years, are in a remarkable state of preservation. They have apparently been kept with care, and are finely formed with long tapering fingers and small nails (now missing).

The total length of the right hand taken from the back is $10\frac{1}{2}$ inches (26·55 cm.), and the length of the hand alone, measuring from the line joining the styloid process of the ulna and radius to the tip of the middle finger, $7\,{}^{5}_{16}$ inches (18·55 cm.). The diameter from median to lateral metacarpal is $2\frac{3}{4}$ inches (7 cm.). Allowing for shrinkage in the process of time, the hands are below the average in size for a man. It is noticeable, however, that the wrists are strong and well knit, as might be expected in those of so good a swordsman and great warrior as Thomas Beaufort, Duke of Exeter.

Aorta from the mummy of Menephtah, regarded as the Pharoah of the Exodus. The condition presented is that characteristic of senile calcification of the media of the aorta.*

Root of the aorta of King William IV showing calcareous degeneration of the valves, from the Museum of Sir Astley Cooper.

At the back of **Shelf C** is a **left rib, of King Robert the Bruce of Scotland.** Many years before his death, the rib was injured during a jousting-match in England. A sharp ridge of bone near the angle appears to mark the site of an old fracture. When his coffin was opened in 1822 and the body identified, this rib was removed by the late William Mackenzie, F.R.C.S., and presented to the Museum by his widow in 1879.

The **thymus gland of Princess Louise,** who died July 11th, 1832, at the age of seventeen years. From the museum of Sir Astley Cooper.

Cast of the left humerus of Dr. David Livingstone, the African explorer, showing a fracture caused by the bite of

* *See* S. G. Shattock, Proc. Roy. Soc. Med. 1908–9, Vol. ii. Path. Sect. p. 122.

a lion thirty years before his death. It was by the condition of the left humerus that his body was identified by Sir William Fergusson when it was brought to England in 1874.

Here also are the **upper end of a thigh bone excavated at Herculaneum,** and a **thigh bone found in a grave assigned to the period of the Roman occupation,** showing a healed fracture of the shaft.

Petrous bone and stapes of the grandson of Rameses the Great, taken from the tombs of the Queens at Luxor.

Walking stick that was carried by Martin van Butchell, the eccentric quack-doctor in 1770. It was given by him to William Webb, whose offer of 5s. reward to the finder is engraved on a silver band.

In Case 5, on Shelf A, is a specimen of **Byssus of pinna nobilis,** a horny secretion from a gland in the foot of many bivalve molluscs, with a pair of gloves and objects woven from it, and **spider's silk** woven into ribbon.

Shelf B. Instruments and skewers used by the Rafai fakirs of Hyderabad City for insertion into the head, for piercing the cheeks and tongue, and for dislocation of the eyeball.

Native cupping vessels made from gourds and used by tribes on the Congo. **Two "whistle-cocks"** worn by natives in West and Central Africa for protecting the penis. At the back of **Shelf C** are two **Roman terra cotta votive offerings,** one the male genital organ and the other a uterus. These objects, models of the part afflicted, were placed or hung in the temples or shrines by the Romans after recovery from some disease that had affected them.

Two cauls, one specimen from a person who died in 1793.

There are many curious traditions connected with the caul which date from the early Christian era. The Romans believed a child born with a caul would be prosperous throughout life. Chrysostom states that the midwives sold them for magical purposes.

From early times they have been regarded as infallible charms against drowning, a tradition that appears to have

arisen in the East, and in the eighteenth century sailors are said to have sometimes given from £50 to £100 for a good specimen. During the submarine peril in the Great War cauls as charms are said to have been in demand in London.

Ambroise Paré, referring to the caul says, "the mydwives prophisie or foretell that the child shall be happy born as it were with a load on his head."

In Scotland the caul is called "selyhow," holy or lucky load. The specimen marked **157.4** was in former times in frequent request by persons about to depart on a sea voyage.

Here also is a **narri-coombo or jackal's horn,** which sometimes covers a bony process on the skull of the jackal, and is regarded by natives of Southern India as a powerful charm against evil and to bring prosperity to the possessor.

A witch doctor's outfit for ordeal by poison from the Lower Shire River, Central Africa. The witch doctor belonged to the Amazaro (Achikunda) tribe, of the Anyanja group of the Bantus.

It comprises :

(a) Mortar and Pestle solely used for the preparation of the decoction of the bark.

(b) Gourd drinking cup for the administration of the poison.

(c) Specimen of the "Mwabvi" bark (Erythrophleura quineense) from which the poison is extracted.

"Nearly all deaths," says the donor, "especially those from some uncommon cause or from animals, are attributed to witchcraft, and any person is liable to be accused of causing the death, particularly one with whom the deceased was known to be at enmity. Either side may demand resort to the poison ordeal. After administration of the decoction, death is proof of guilt, vomiting of innocence.

"Occasionally the poison is administered to fowls impersonating the litigants.

"The custom is widespread over a large part of Africa, and this outfit is typical. It belonged to a native who was undergoing a long term of penal servitude for causing the death of a large number of persons."

In addition, the outfit includes :

"(a) A rattle : this corresponds to the conjuror's wand, and is used to conceal the manipulations of the operator.

(b) Box made from the back of a tortoiseshell which by its movements was used for prognosticating. This 'speaks' by moving in certain ways.

(c) Two stones. These are thrown somewhat after the manner of dice ; the answer to questions is affirmative or negative, according to their position when they fall—*e.g.* whether separate or together.

Lots (*ula chisango, etc.*) are resorted to for the detection of any person or thing hidden from the enquirer, *e.g.* a thief (*in propria persona*), stolen goods, omens for a journey, etc. The answers are given to specific questions—'Yes' or 'No.'"

On **Shelf C** is the **heart of a Calf** into which are inserted pins, thorns and twigs of witch-hazel. Such objects have been employed in the practice of witchcraft from a period of great antiquity with the idea of injuring or wishing ill to an enemy. Primitive tribes in Central Africa illustrate the same idea in the ju-ju figures of wood that are set up by the witch-doctors. The ancient Babylonians and Egyptians employed clay or wax figures for this purpose, and similar figures were used in European countries in the Middle Ages.

The use of the heart is an example of sympathetic magic, and the piercing of it with nails, pins or sharp thorns were believed to produce a like effect on the person against whom the operation was directed.

This specimen was found in a chimney of a cottage near Bridport by a local clergyman, in 1902.

An **Eagle-stone or Aetitis** used as a charm to facilitate delivery and prevent miscarriage. It is a variety of argil-. laceous oxide of iron and was worn bound to the arm or thigh. These stones are composed of concentric layers, sometimes hollow, which rattle when shaken and take their name from an ancient tradition that the eagle transported them to its nest to facilitate laying her eggs.

A **Lingam** from Allahabad, worshipped as a symbol of the god Siva or the generative power of nature, in some parts of India.

Specimen of a **human scalp** dried and stretched upon a ring of cane, said to have been worn by a North American Indian chief.

A **clay figure from a beehive Aztec prehistoric tomb,** Coalcuman, Mexico, showing a condition of angular kyphosis and priapism.

On the west wall is a copy of a **Tibetan anatomical chart** in the Chagpo-ri, Temple of Medicine at Lhasa. On the top of the chart are small representations of Buddha and eleven other Tibetan gods or incarnations. The squares into which the central figure is divided are intended as a guide to treatment. The patient indicates the position of the pain and is treated by a fixed rule according to the square in which the pain occurs.

Two cases containing models of **diseases of the eye,** executed by Josef Vals under the direction of Professor Gimbernat of the Royal College of Surgeons of Barcelona.

Drawing of a skeleton kneeling, by Schwantzfagen, believed to be the original of the engraved illustration in Cheselden's " Osteographia," 1733.

In the case are a **ring worn by Brice,** the giant, **two ivory billiard balls** showing the result of an injury to the tusk from which they were made ; **two Roman bronze phallic charms** worn against the evil eye and to prevent sterility.

Case 6. Preservation of the Dead.

The embalmed body of a woman named Johnson, aged 24, who died of phthisis in the Lock Hospital about 1755 and left her body for dissection to Mr. Sheldon and another student who had befriended her. They cast lots for it, and it fell to Sheldon, who was at that time a pupil of the Charity.

Although there is no record of the process employed by John Sheldon for preserving the body, a letter which accompanied the specimen states : "much camphor was used, and all the arteries and veins were filled with that injection. Spirit of wine was used as well as camphor, and the heart and intestines were taken out and injected and replaced, as was also the brain."

Attention is called to the form of the foot, which is distorted by the fashion of the time through wearing high-heeled shoes.

The embalmed body of the first wife of Martin van Butchell, born in 1739, which, at his request, was prepared by Dr. William Hunter and Mr. Cruickshank in January 1775.

Martin van Butchell, an eccentric quack-doctor and dentist, practised in Mount Street, Mayfair, about 1770. He had been a pupil of John Hunter. The body was preserved by injecting the vascular system with oil of turpentine (coloured with vermilion) and camphorated spirit, and packed with camphor, powdered resin and nitre in the cavity of the chest and abdomen. Hunter is said to have also injected a carmine fluid into the blood vessels and inserted glass eyes, to give the body a life-like appearance. Till his second marriage van Butchell kept the embalmed body of his first wife, arrayed in a garment of fine linen and lace, in his sitting-room. He was in the habit of riding in Hyde Park on a white pony painted with purple spots, as shown in the engraving.

Case 7. Mummy of Horsiesi, an incense-burning priest in the Temple of Ammon at Thebes. This mummy was unrolled by T. J. Pettigrew on June 16th, 1834. The large

scarab on the chest is notable, also the fragments of a necklace of amulets still adhering to the chest. The painted mummy case in good preservation is placed next to it.

Case 8, Shelf A, are two **Egyptian skulls** of the Ptolemaic period, showing the holes made for the removal of the brain before embalmment.

Mummy of the Sacred Ibis, venerated by the ancient Egyptians.

The mummified **liver of a Priestess of Amen** of the XXI Dynasty (1500 B.C.) from Deir-el-Bahari, Thebes, showing the gall-bladder quite filled with small spherical calculi.

Shelf B. Viscera of a priest of Ammon, (ca 1000 B.C.), **lungs and intestines** with figures of ape-headed and hawk-headed gods, also the liver and stomach, with other deities. **Hands and forearms** from mummies of the Ptolemaic period.

Peruvian mummy found near Juliaca on the plains of Titicaca in May 1908. A section has been made to expose the condition of the viscera. There is evidence of empyæma in the left pleural cavity.

The **mummy of a child from Columbia.**

Case 9, Shelf A. Mummies of two infants, young crocodiles and a **cat.**

Shelf B. Human remains found five feet below the surface in virgin peat moss at Underbarrow, Westmoreland.

Bones from a prehistoric interment at Constantine Bay, Cornwall, in a remarkable state of preservation.

The **dried body of a boy** about twelve years of age, found erect with his clothes on, in 1742, in a vault under old St. Botolph's Church, Aldgate. He is supposed to have been shut in and forgotten at the time of the plague of London in 1665.

Shelf D. Specimens of ancient materia medica. Various organs and parts of the human body entered into the materia medica of the XVII century. **Human skull** reduced to powder was given in cases of epilepsy, and a spirit was made from

it by distillation which was employed for the same purpose. The spirit of skull was one of the last remedies administered to King Charles II in his fatal illness.

Dried **human blood,** reduced to powder, was used as a styptic to stop hæmorrhage. **Bezoar stones,** calculi formed in the intestines of Persian wild goats, cows, a species of ape and other animals, were famous from the XII century as antidotes to all poisons. The chief varieties used were the oriental and the occidental, the latter being said to be found in the llamas of Peru.

Scrapings of the stone were also given internally for heart weakness, palpitation, colic, jaundice, fevers and plague, in doses of from 4 to 16 grains.

Goa stones were artificial bodies, made by the Jesuit missionary fathers who settled at Goa in the East Indies in the XVII century. They are said to have been composed of rubies, sapphires, emeralds, hyacinths, topazes and pearls, reduced to powder and mixed with oriental bezoar, white and red coral, musk, ambergris and gold leaf, the whole being made into a paste with rose water. They were carried on the person and inhaled to prevent infection from disease, or a few grains scraped off were taken in wine to counteract the effect of venomous bites.

Terra Sigillata or the Sacred sealed earth from the **Island of Lemnos** has been used in medicine from the first century B.C., to the present day. It is an absorbent earth or clay containing iron and magnesium, with slight astringent properties. The true sealed earth has been stamped with an official seal by the Turks from the XVII century.

Earth from other sources, such as the Strigian earth from Silesia, a white earth from Malta, an earth excavated in the vicinity of Jerusalem, and several other varieties from Germany, Sicily and Portugal, each of which was stamped with a distinctive seal, were also employed.

Terra sigallata formed an ingredient in many important preparations, and was included in most of the pharmacopœias of Europe in the XVI and XVII centuries.

It was used by the ancient Greeks as a remedy for venomous bites, for hæmorrhage, dysentery and diseases of the spleen and kidneys.

It was also frequently prescribed for scabies and gonorrhœa, and was used to prevent the putrifaction of wounds and as an antidote to poisons.

An **oval silver box** bearing the arms of the **Capell family.** It contained a calculus taken from a boy aged seven in 1687, and bears the following inscription : "Deliverance was sent from God to Francis Godman on the 26th day of Sept^{ber} 1687 in the seventh yeare and 10th day of his age." (See letter.)

Palm leaf medical manuscript and stylus from Ceylon, inscribed with recipes and medical notes given by a senior native physician to his pupils and recorded by the student from time to time.

Mandrake (*Atropa mandragora*) has been used in medicine from about 2500 B.C., and is mentioned among the herbs in the Assyrian clay tablets found in the library of King Assur-bani-pal, B.C. 638.

Its powerful properties as a narcotic, and its stupefying effect on the brain, were well-known to the ancient Greeks, and the similitude of the root to the human form gave rise to many of the curious traditions associated with the plant.

A demon or evil spirit was supposed to reside in the root, and elaborate ceremonial was necessary before gathering it, so that the venturesome person who pulled it from the ground should escape with his life.

Wine of mandragora was used as an anæsthetic by the Greeks and Romans, and the fruit and other parts of the plant formed ingredients in many of their love philtres.

The root was also carried as a charm or talisman to promote fecundity in Europe and the East. The Germans carved the natural root to give it a more human appearance, and these mannikins called *Alrauns*, were much sought after by women. A specimen of one, in which two faces are carved in the root,

is exhibited. The other specimen, brought from Syria, is a natural root which bears some resemblance to a woman holding a child.

In the lower part of the case is the **mummy of a child from New Guinea,** probably from Darnley Island.

Case 10, Shelf A. Specimens of the soft parts of animals converted to adipocere.

Adipocere is obtained by exposing the soft parts of animals to the action of running water. It consists chiefly of margaric and oleic acids, both free and in combination with lime. These specimens are supposed to have taken about six years in transforming and were removed from the tank belonging to the dissecting room at Christ Church, Oxford.

Shelf C. Specimens of **tanned human skin** and **pieces of Danes skin** found attached to Church doors.

(*a*) is a piece of skin from the shoulder of a remarkably stout man. It was tanning from April to September.

(*b*) is a portion of human skin dressed as a piece of leather.

On the doors of several ancient Churches in East Anglia pieces of human skin have been found nailed to the wood, which are believed to have been taken from Danish raiders who had been flayed.

Flaying was practised on enemies as a punishment in the XIII century, and was inflicted on Danes and other invaders captured in raids on our shores.

Those caught in the act of pillaging churches were flayed, and a piece of their skin was nailed to the church door, as a warning to all who might approach the sacred edifice with unhallowed and evil intention.

(*c*) is a piece of skin said to be from a Dane, removed from the door of Hadstock Church in Essex.

(*d*) is a portion from the door of Copford Church in Essex.

(*e*) is a piece of human skin removed from the door of Worcester Cathedral ; probably taken from a maraunder and nailed up as a memorial of vengence.

On **Shelves B and C** are specimens of **shrunken heads** as prepared by Indian tribes in Eastern Ecuador and the upper reaches of the Amazon.

The custom of preserving and shrinking the heads of their enemies is practised by the Aguarunas, the Mundurucus, the Makas, the Piubuc, the Jibaro and other tribes of South American Indians.

These heads are usually worn as trophies slung to the girdle, but the heads of chieftains thus preserved are kept as relics.

Until recent years little was known of the methods employed for shrinking the heads, but the process used by the Jibaro Indians has now been described by Karsten. To prepare the head, the skin is slit at the back from the apex downwards and carefully stripped from the skull. It is then attached to a vine and boiled. A ring of creeper is made for the neck, and the back of the head is sewn up with thread.

The process of reduction is effected by means of hot sand introduced at the aperture of the neck. While this is being done, the head is kept in motion so that the sand may act equally on all parts. As the sand cools it is poured out, and the inside of the head is scraped with a knife to remove the charred matter. This process is repeated until the head is reduced to about the size of an orange. The head and features are then moulded by hand to retain their human resemblance. Particular attention is paid to the hair, which is considered the most essential part of the trophy, and is believed to be the seat of the soul. The lips are stitched together with a long string to keep the souls of the enemy under magical control. The whole process of shrinking is said to take about forty-eight hours.

It is believed that salt and barks containing a large proportion of tannin are used in the boiling process, which is carried out with great secrecy by the medicine-men of the tribes.

Pieces of lead coffin turned into carbonate of lead by the gases given off by the decomposing body. They were found in the vaults of St. Martin's-in-the-Field Church by the late Frank Buckland when searching for the coffin of John Hunter.

A **Memento Mori** modelled in wax by Zombo or Zambo of Naples in 1660. Models illustrating the human body in the first stages of decomposition were executed with great fidelity by several Italian sculptors. Zombo, who became famous in the XVII century, carried out his models in coloured wax.

A **cholera horn,** which was blown as a warning when the disease broke out in a Hindu village. It was also used to give notice of an outbreak of plague or other disaster.

At the bottom of **Case 10** are several specimens of **Apothecaries scales and weights** dating from the XVIII century.

In the top gallery in Room II are four anatomical preparations on panels of great historical interest, as they originally belonged to John Evelyn, F.R.S., the diarist, and were described by him on Jan. 1645-46, Nov. 5th, 1653, and Oct. 31st, 1667.

They were presented by Evelyn to the Royal Society in 1667, transferred to the British Museum in 1782, and to the Royal College of Surgeons in 1809.

Their history is thus described in his own words : " Dr. Jo. Athelsteinus Leonoenas of whom I purchased these rare tables of veins and nerves caused him to prepare a third of the lungs, liver and nervi sexti par : with the gastric veins, which I sent into England and afterwards presented to the Royal Society, being the first of that kind that had been seen there, and, for ought I know in the world, though afterwards there were others."—Jan., 1645-46.

Later he writes : " Dr. Scarborough was instant with me to give the tables of veins and arteries to the College of Physicians, pretending he would not only read upon them, but celebrate my curiosity in being the first who caused them to

be complete in that manner ; but I was not so willing yet to part with them as to lend them to the College during their anatomical lectures ; which I did accordingly."—Nov. 5th, 1653.

In a later entry Evelyn says : " Blessed be God for all his mercies ; I made ye Royal Society a present of ye table of veins, arteries and nerves which great curiosity I had caused to be made in Italy, out of ye Natural Human Bodies by a learned physician, and the help of Veslingius (Professor at Padua) from whence I brought them in 1646. For this I received ye public thanks of ye Society and they are hanging in their Repository with an inscription."—Oct. 31, 1667.

The panels were described by Mr. Cowper, as it is recorded : " 1701-2, 21st January. At the Royal Society there was read and approved the delineation and description of my tables of veins and arteries by Mr. Cowper, Chirurgeon, in order to their being ingraved."

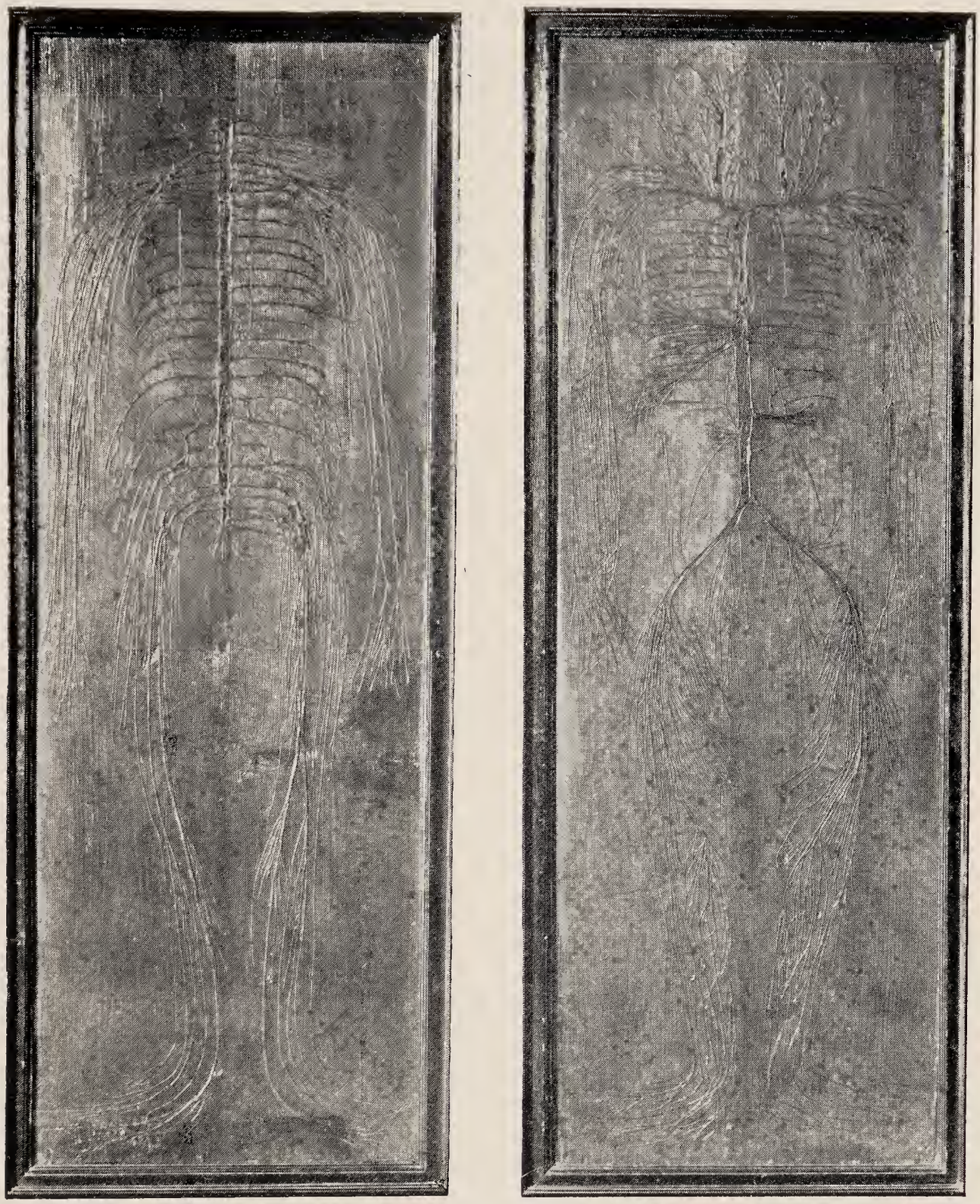
The description and figures by William Cowper, F.R.S., appeared in the ' Philosophical Transactions,' 1702 (p. 1177).

It is noteworthy, that although these preparations were made in Padua in 1646, twenty-five years after Harvey published his account of the circulation, the inferior vena cava is still shown in continuity with the superior vena cava.

On the west side of Room I is the **mummy of Ra-Nefer,** a high official under Senefru of the IV dynasty, taken from his tomb at Medum.

Ju-ju or fetish from Ohitsba, Nigeria. This interesting piece, which belonged to a notorious witch-doctor, was used in his sacred rites. It consists of a " mass," probably of " medicine," bound together with fibre surrounded by a circle of eight human skulls, one of which has an indentation probably caused by a blow.

In the " mass " is inserted upright, four human thigh bones, a fetish figure carved in wood, a native knife, a native dagger with carved wood handle, two rough pieces of wood, an iron skewer and a hand carved in wood. A number of



Anatomical preparations on panels that originally belonged to John Evelyn, F.R.S., and are described by him in his Diary.
1645–1667.

pieces of paper, some being apparently torn from Government documents, were found packed under one of the skulls.

In the entrance vestibule of the College is an interesting old **signboard** that belonged to an **apothecary** or **barber-surgeon** dated 1623 which was found at Poole, in Dorsetshire.

It measures 36 by 24 inches together with its frame, the whole carved on one panel of wood, the figures being in high relief and painted in colour. It is divided into eight compartments, in seven of which various operations, such as venesection, surgery, dentistry and other methods of treatment are represented.

In the centre stands the sturdy figure of the apothecary himself, flanked by two yellow marbled pillars surmounted by caryatids evidently forming the door of his shop, as behind him are three shelves, on which stand an array of drug jars and bottles. He wears a ruff, short cloak and trunk hose, and carries his gloves in one hand.

In the compartment above, he is represented wearing a long coat, standing at the bedside of a patient, examining a specimen of urine in a flask which he is holding in his left hand. The patient, whose head is swathed in linen, is lying on her side in a four-post bed which is elaborately carved.

The upper compartment on the left represents venesection. The patient, a woman, wearing a frilled cap and ruff with a grey skirt and apron, is seated on a chair. In her left hand she is holding a basin to catch the blood which is seen spurting from her arm, while with the other she grasps a staff to distend the veins. The operator, standing in front of her, has the fingers of one hand on her pulse, while he holds her by the shoulder with the other.

In the compartment below, a man is having his left leg amputated below the knee. The patient, apparently unperturbed, is seated on a stool grasping the upper part of the limb with his hands, while the operator wields a large saw with one hand and grasps the foot with the other.

In the compartment beneath, a patient is having a tooth

extracted. In the top compartment on the right, the apothecary is represented reducing the dislocated shoulder of a patient who is seated on a chair, while in the one below he is seen examining a woman, who is evidently suffering from a tumour on her breast which he is about to cauterise. In the last compartment he is shown examining a man who stands attired in a white shirt and brown breeches, and is wearing a short sword. His right arm, which is extended, is flexed from the elbow as if he was unable to move it, and the operator is apparently exerting pressure on his lumbar muscles.

Across the lower part of the panel is carved the following inscription :

Altissimus/creavit de Terra Medecinam et vir/Prudens non Abhorebit illam/Anno Dommini 1623.

This interesting relic admirably illustrates the varied activities of the apothecary in the time of King James I, over 300 years ago.

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